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Pascal for the 6809 is a true native code compiler. Unlike the Pascal for the buy is a true native code compiler. Unlike the usual P-code Pascals which run in an interpretive manner. usual P-code Pascals which run in an interpretive manne ours produces efficient assembly language mnemonics. ours produces efficient assembly language mnemonics
which can be assembled and run directly. This compiler is
which can be assembled and run directly. Many feature
available for both 6800 Ft EXTM and Linies EXTM. which can be assembled and run directly. This compiler is available for both 6809 FLEXT and UniFLEXT Many features available for born bouy FLEX and UnifLEX Many reatures not found in other Pascal systems were implemented and formal form not tound in other Pascal systems were implemented while avoiding those features completely non-standard. Features the Pascal system include:

 Supports most of Jensen and Wirth specification • Produces fast and efficient 6809, native code the Pascal system include:

• FLEX run-time package may be trimmed Double precision real numbers (10.6 digits)
 Implements scalar, subrange and structured data types Double precision real numbers (16.8 digits)

• Standard I/O using file buffer pointers

Dynamic storage allocation

• FLEX version may call assembly language programs Ability to call other Pascal programs

• buriered or single character terminal input
• Standard math functions: SIN, COS, ARCTAN, EXP, LN, Buffered or single character terminal input

 Random number generator function Many usable, sample programs included

Ability to call various UniFLEX system routines UniFLEX version supports: Ability to execute UniFLEX utility commands Random file positioning Pascal on diskette for 5" and 8" 6809 FLEX is available Pascal on diskette for 5" and 5" body FLEX is available for \$200.00 The 5" version requires two disk drives. Tor \$200.00 The 5 version requires two disk drives.
The UniFLEX version is \$300.00 and includes one year of maintenance. me uniflex version is \$300.00 and includes one year maintenance. All orders should include 3 percent for maintenance and handling its percent or fersion orders. maintenance. All orders should include 3 percent for postage and handling (10 percent on foreign orders). pustage and manufing (10 percent on foreign orders).
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68

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SWTPC 6800-6809-DMAF2-CDS1-CT82-Sprint 3 Southwest Technical Products 219 W. Rhapsody San Antonio, Texas 78216

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TABLE OF CONTENTS

Yol	. 17,	Iss	eue	۷I			June	182
FLEX User N	otes						9	Anderson
"C" User No	tes						13	COMMO
COLOR User	Notes						16	Nay
NIXON Video	Brd	- P	rod	. A	nn.		18	1117
2 MHZ PROM							19	Disk Prog.
6800 Recleve	e Breat	K C	Irc	ult			19	MIIIs
"DRAM-64K" 1	Mem. B	rd.	-	rev	lew		20	staff
*FORTH .							21	Talbot
QUICKSORT							21	Harkness
05-9 Notes							25	Cadmus
V-DISK - re	VIOW						27	Pass
BI† Bucket							28	
FLEX2 UPSAV	E/DOWN	LOA	D				34	Ousterhout
"HELP"							39	
Classifieds							40	
Advertisers	Index						62	
-								

MICRO JOURNAL

Send All Correspondence To:

Computer Publishing Center 68 MICRO JOURNAL 5900 Cassandra Smith PO Box 849 Hixson, TN 37343 615 842-4600

Copyrighted 1982 by Computer Publishing, Inc. (CPI)

68 Micro Journal is published 12 times a year by Computer Publishing, Inc. Second class postage paid at Hixson, Tennessee and additional entries. Postmaster: send form 3579 to 68 Micro Journal, PO Box 849, Hixson, Tennessee.

Subscription Rates

1-Year \$24.50 2-Years \$42.50 3-Years \$64.50 USA

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Articles submitted for publication should be accompanied by the authors full name, address, date and telephone number. It is preferred that articles be submitted on either 5 or 8 inch diskette in TSC Editor format or STYLO format. All diskettes will be returned.

The following TSC Text Processor commands ONLY should be used (due to our proportional processor): "Sp space, "pp paragraph, "fiffil and "nf no fill." Also please do not format within the text with multiple spaces. The rest we will enter at time of editing.

STYLO commands are all acceptable except the ,pg page command, we print edited text flies in continous text.

All articles submitted on diskettes should be in TSC $FLEX^*$ format, either FLEX2 6800, or FLEX9 6809 any version.

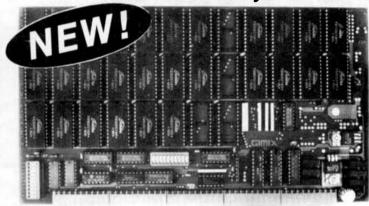
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All letters to the editor should also comply with the above and bear a signature. Letters of 'gripes' as well es 'praise' are solicited. We attempt to publish all letters to the editor verbatim, however, we reserve the right to reject any submission for lack of 'good taste'. We reserve the right to define what constitutes 'good taste',

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C LANGUAGE COMPILER



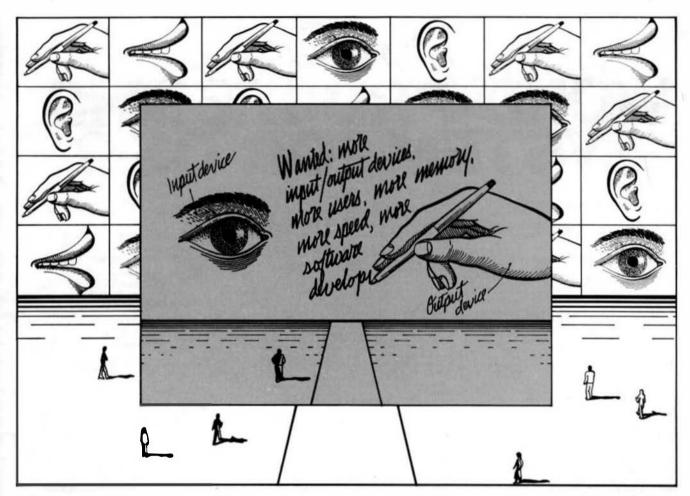
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For information contact your computer supplier, or



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OS-9 USERS:

If your computer has a SCREEN and you're still strug-gling with an editor that only knows about LINES, then obviously YOU don't know about

DynaStar

DynaStar is a powerful. menu driven scleed editor equally swited to the tasks of program preparation and document Processing. With the addition of the obtional DynaForm print formatter, it is the best word processing becade gou can buy for your OS 9 system.

DynaSter Welson II is now evairable and teatures no nonsense what you see is what you get" editing for virtually any terminal with or without cursor addressing (it must be at least able to go to "home"). To edit, simply place the cursor where you want it, and type. Any printable character you type is entered directly into your text, and any non-printable control character causes immediate execution of an editing command. Single keystroke commands permit movement of the cursor in any direction, by character, tab, word, line, or screen full, and deletion of characters, words (left or right) or a whole line. Two keystroke commands augment this set by moving the cursor to the left margin, top or bottom of the screen, beginning or end of the edit buffer, or the beginning of the next paragraph. You can search for any string, replace with any other, do it again, mark original blocks of text, copy, move or delete blocks, read or write to side-files, set tabs and margins, or center the current line.

DynaStar leatures automati word wrap, and it can right-justify feel as you arrier it so you will see exactly hop it will book aerbee you graint if, If you later make alterations or change the malgins, you can reform the

terl e paragraph at a time with two keystrokes. For pro-grammes, there is a special automatic indent mode to help you write well-structured code. DynaStar includes a Shell command which lets you do almost anything (in-chiding edit another file) without even losing your place or your current document, and it permits editing of large disk kiles in stages without forcing you to break up your

lites
Il you want to deline more powerful commands, Dyna
Il you want to deline more powerful commands and continue to the company and the continue to the cont

Illyou want to deline more powerful commands. OynaStar includes a macro facility which lets you convert any
control character to one or a string of characters or your
choice. You can use this feature to create global search
andreplace commande insert "botter plate," or simply
remay your keyboard. You can also provide a special
"start up string" which is automatically executed
whenever you enter the editor to set up mile such as
autotustify, display a directory, define your feverale
macros, or remap the keyboard. For complete word-processing, we other your services
For complete word-processing, we other our OyneForm first formaties which provides all the standard
features such as pegination, headers and spoters eith
page numbers. Single space, doubles space, bold face, double-strike, and underline.
DynaStar to make your and such as the standard
apphality for generating form letters and mailing lists,
and it can generate an index automatically, sorted
alphabetically or by page number. You can call it from
DynaStar to proof-print the active edit buffer, or by itself
to print a disk file while you edit another.
DynaStar to proof-print the active edit buffer, or by itself
to print a disk file while you edit another.
DynaStar to be sorted in a swallable today. If you're still not
convinced that it would be the best thing that ever happened to your video terminal, you can order our "Doubting Thomas" lest pax consisting of complete document
alto your heart's content, but won't update your files.
Later when your doubts mell away, you can obtain credit
on the full purchase price and join the faithful who
bought the whole thing in the first place.

on the full purchase price and join the bought the whole thing in the first place.

"Doubting Thomas" test pa DynaStar II (for the faithful) DynaForm text (ormattet \$ 49.95 \$149.95 \$149.95 \$275.00 oth purchased togethe Note: DyneStar Version I (no macros) will be available at the original price until May 31, and current owners may upgrade to Version II with full credit until June 30.

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FOR OS-S AND FLEX

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For OS-9 and FLEX

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SPECIAL

CHESS program coded in A/BASIC (originally sold for 550) is included FREE on the disk in both source and object for your enjoyment. Also some utilities are included for testing and examples, all in source on the disk!

ONLY \$150.00 apecify OS-9 or FLEX

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Now you can have GRAPHICS added to all your pro-grams, Just write the dale out to a virtuel array and call PLOT PLOT be written in TSC XBASIC and the source is included on the lisk. INFINITE AESOLUTION GRAPHICS ON YOUR TEA-MINAL OR PRINTER MISTOGRAMS, SARGRAPHS, XY PLOTS PLUS OTHERS. IN TSC XBASIC SOURCE INCLUDED ON DISK. \$44.95

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The Programmers Toolbut is a openage of ultilities and programs that extend the capabilities of FLEX to the ulmost

PRICE \$49.95 object only \$69.95 with source on disk!

Dynasoft PASCAL 1.4 for OS-9

Dynasoft Pascal 3.4 includes all the teatures of the FLEX version 1.3 with the following enhancements Chain, Fread, Fwirte, Seek, Open, Create, Close, Delete, Fork, Send, Weit, Sieep, Seltime, Time, Gestetus, Setstatus, SatPriority, GelProciD, and JSR. Fhis is an excellent and fast program, small enough to write utilities but powerful enough for things (ike DynaStar, Object only 369.95.

Add 104 run-time—ource on dish 330.00.

Add for source of Dynasoft Pescal itself \$125.00.

D 6 D

MULTI CPU CROSS ASSEMBLER FOR 6809 FLFX by Frank Hoffman

CRASMB is a conditional macro assembler with the capability to use different CPU overlays in order to cro s assemble. Thuse CPU overlays called CPU PERSONALI TV MODULES (CPM s) can be called from a source free. TV MODULES (CPM s) can be called from a source free, thosely insaling it easy to create object code for a valuely of CPUs. It is also possible to create new CPM's youself to range for 16 bit CPU. The information needed is included in the anual if you de ide to do this, it would be advisable to putchase the source to one of the CPM's and modify it rather than starting from scratch CPM's are currently available for the following CPU's 6000, 6000, 6000, 6000, 6000, 5002, 20000000, 1002, and others coming.

PRICE \$139.95

Includes one 8 bit CPM of your choice Inol source: Additional CPM's

8 Bit \$25.00 Source \$25.00 extra

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Explore Peckage now included at the same price THE PURCHASE ORDER system adds outchase olders to the BitL PAYER. This package of programs adds another level of control to your expanditures. Prints out purchase orders and keeps track of purchases. Requires the Bitl Payer to early

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Includes manual add equice supplied on disk in TSC Extended Basic

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COLOR **COMPUTER USERS**

THE POWERFUL FLEX DISK OPERATING SYSTEM WITH **MUNDREDS OF SOFTWARE PACKAGES IS NOW AVAILABLE!**

Now you can run FLEX, OS-9 end Radio Shack disk eofhware on your Color Computer, if you have a 32 R. Color Computer with the Radio Shack disk system, at you need to do is make a trivial modification to access the hidden 32K, as described in the Feb. issue of COLOR COMPUTER NEWS and the April issue of 68 Micro. You can get FLEX from us right now. OS-9 will be ready by suffrow. Phaste note that this will only work eith the Radio Shack dish system and 22K/84K mamour) chips that RS calls 32K. Maybe they put 64K s in yours, too. If you don't have a copy of the article, send a regal size 58SE (40e stamps) and we'll send it to you.

Using this system to run FLEX and OS-9 has many edvantages. First, it gives you sell from zero right to FLEX. This means that ALL FLEX compatible software will run with NO MODIFICATIONS and NO PATCHES! There are no resumply conflicte bysquaye we moved the acreen up above FLEX which leaves the lower 48x free for user programs.

What you end up with is 48K for user programs, 8K for FLEX and shother 8K above FLEX for the screens and stuff. We have a muth screen format so you can page becaused to see what scrolled by and a Ri Res screen that will enable us to have 24 lines by 42 character display is on the way. That's better than an Apple!

We also implemented a full function keyboard, with a control key and escape key. All ASCII codes can now be generated from the Cotor Computer keyboard!

We also added some bells and whistles to Radio Shack's Disk system when you're running FLEe or OS B We are supporting single or double sided, single or double density, 35, 40 and 80 track drives. If you use double sided drives, the maximum is three drives because we use the drive's Brack disk. If will work with the double sided drives but it will only use one side and only 35 tracks. Using 80 track drives is oldey, but will not be compalible with standard Radio Shack software. You can also set es highly es a sepping rate and driv. Type, (SSor OS - SD or DD)

In case you don't understand how this works, ill give you a brief explanation. The Color Computer was de-signed so that the roms in the system could be turned

off under software control. In a normal Color Combuter this would only make it go away. However, if you put a program in mercely to de something first title boot in FLEX or OS-9, when you turn off the roms, you will have a tull 64K RAM System with which to run your program. Now, we need the other half of the 64K ram chips to work, and this is also be the case most of the time, as the atticle states. Of course, you could also put 64K hos in.

Some neal utilities are included

MOVEROM mov is Color Basic from ROM to RAM, Be-cause it's moved to RAM you can not only access it from FLEX, you can run it and even change it! you can load Color Computer cassatte software and save it to FLEX disk. Single Orliva Copy, Format and Selup commends plus an online help system are included.

Installing FLEX is simple. Insert the disk and type:

BUN "FLEX"

That's all there is to ill fou are now up and running in the most popular disk operating system for the 8608. There are hundreds of solf-ware packages now running undar the FLEX system. Open your Golor Computer to a whole new world of software with FLEX.

FLEX \$99.00

Other languages available include; FORTH, Pascal, Fortran77; C; AJBASIC compiler, plus more.
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TRS-80 COLOR COMPUTER COMPLETE WITH 84K RAM. 24K ROM. SINGLE DISK DRIVE AND FLEX, SET UP AND READY TO RUN FOR ONLY \$1.275, includes 80 day salanged waitanly. Il you have a Computer, call about RS disk controllers and drives.

AUTOTASK

WITH MENU

AUTOTASK with MENU is a revolutionary new concept designed to overcome the Problems and frustrations which confront the non-technical when using a combutar. Users are greefed with a series of self-prompting interactive menus inking directly to the application. Several example menus are provided. You can create your own menus from simple text lines. AUTOTASK with MENU gives you untimited software flexibility by providing a system to coordinate multiple-application programs.

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PRICE 9129.95

includes source on disk! Manual \$10.00

6502 TRANSLATOR Translator 6502 code to 6809 \$75.00

INVENTORY with MATERIAL **REQUISITION PLANNING** \$100.00

SUPER SLEUTH Disassembler for 6800/6809 or Z80 \$99.00

> **TABULA RASA Electronic Spreadsheet** \$100.00

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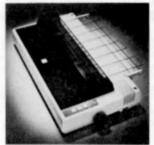
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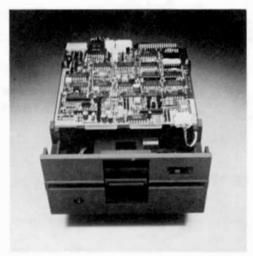
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C DUMP PROGRAM

As I mentioned last month, this month's column will be a discussion of the Memory Dump program presented in Pascal last time, converted to C. Since live received some valuable input from Norm Commo, author of the column on C, i will include his version of the program too.

Have you just gotten used to the use of BEGIN and END in Pascal, and found it rather nice to enclose comments in "curly braces" ? You are in for a jolt. In C, BEGIN is replaced with a semicolon just as in Pascal. C has eliminated the use of the words DO and THEN, and generally reduced the wordiness of Pascal. Variable declarations are present but different than in Pascal in that the type of the variable comes first, and there is no heading as such for the VAR section as in Pascal. The alternate comment delimiters in Pascal are, as you may remember, the double character combinations (*and *). In C, one uses /* and */. These are not quite as handy because the "foreslash" or fraction bar is typed in the lower case mode, while the asterisk is upper case. This necessitates use of the shift key at each end of a comment, and in reverse order, and I, at least, always get out of sync at one end or the other. On my terminal this produces the delimiters ?: and :?, which C doesn't like at all.

Having a copy of Duggers small C for evaluation, and having just received an update of the original, I decided to strike out on my own and see if I could translate my Pascal program into C. This is not always the best approach because translations are not necessarily the most efficient. Sometimes you have to think in the language from scratch in order to arrive at the best solution. Anyway, I did translate the program. My skill level with C might be revealed by the fact that at one point, I had over 30 compiler flagged errors in the two page program. After getting rid of those, it still didn't run for beans. Turned out that I had overlooked or forgotten a detail. Strings in C are delimited by double quotes, but character constants and values are delimited by single quotes. When I got that straightened out, I was a long way toward having the program running.

You might note that the main difference in organization between C and Pascal is that all the subroutines (functions in C, and FUNCTION or PROCEDURE in Pascal) are in a different place. Pascal requires them to be ahead of the main program, and C requires them to follow it. In C, functions are distinguished from variable names by the fact that they have parameters. Therefore you must include the parentheses that surround the parameter list even if there are no parameters passed to the function. I don't like typing printf ("On"); when I want a linefeed and CR, so I wrote the function skip(). Skip simply outputs a CR and an LF in that order. No parameter is sent to it, and none is returned. You may see that it would be easy to pass a count to it to output multiple linefeeds, but I only needed one in all cases, so I didn't bother.

It is a feature of C that arithmetic overflow is not checked, so that an integer may just as well represent an address (an unsigned integer value), as a signed integer. That simplifies the handling of page, making the treatment the same as in the OmegaSoft Pascal where HEX type is available. This C has only one loop control method implemented, the while loop. I had used a FOR NEXT loop in Pascal, and a REPEAT UNTIL. The conversion presents minor problems. In the case of

converting a FOR NEXT to a WHILE, it is only necessary to initialize an index variable to 0 before the loop, and increment it at the end of the loop. The while checks for it passing the upper limit of the loop and the loop terminates nicely. A REPEAT UNTIL may be duplicated, the only consideration being that the variable to be tested must be initialized to some value that is included in the while condition or the loop won't be executed at all.

I used the library function putchar for most of the output. Putchar allows output of one or two characters at a time. You may note seemingly careless mixing of integer and character types of data. For example, in the function hex, you will see a statement that reads "ch = number - 10 + 'A'; ch is a character variable, number an integer, 10 is obviously an integer constant, and 'A' a character constant. C is designed to allow this. All characters are converted to integer, le 2 bytes whenever they are used in a statement. They are stored as single bytes. The programmer must be careful not to assign a value larger than a single byte to a character. This implicit conversion of types makes the program simpler and requires much more care on the part of the programmer if the program is to be successful. Another example of this is in the skip function where the LF and CR are output simply with putchar(13) and putchar(10).

I have used the same variable names in the C version as the Pascal versions, so any difference you see in the programs is due to the language and not the use of long variable names in one and short ones in the other. One difference is that all keywords in C MUST be lower case. Tradition is to use lower case for variable names as well, and all upper case for constants, one of which I have used in this program. The program in C (final binary) is \$A20 bytes long, just a little shorter than the OmegaSoft version. Execution seems faster than OmegaSoft, though I didn't make any accurate timing tests. C buffers all input through the library function getchar(), and I didn't like having to hit return to enter commands, so I implemented getch() as a jump to FLEX GETCHR. I determined that parameters are passed to a function (in this implementation) on the 6809 user stack, and any returned value is passed in the X register. The main program cleans up the stack on return from the function. That is, the function doesn't have to remove the parameters from the stack, just read them.

Obviously, C allows in line assembler code by means of the compiler directives #asm and #endasm which must start in the first column of a line. All text between those two symbols is passed straight through the compiler as it generates assembler source code for everything else in the text file. You may see a very strong resemblance between the getbyte function in C and the GETBYT code in the assembler external for the OmegaSoft version. The differences are due solely to the difference in the way parameters are handled in the two compilers. You may have noted that the assignment statements in C use = rather than the := of Pascal, and the test for equality is == in C rather than the = in Pascal. Just a little confusing at first, though more efficient, since (usually) there are more assignment statements in a program than equality tests. C uses I= for not equal, and \$ for MOD. One other feature of C is shown in the listing. #define CR 13 defines the identifier CR as being replaced with the integer value 13 wherever it appears in the program. This is exactly like an equate in assembler. It is equivalent to using CR EQU 13 (or \$0D) at the start of the assembler code. Wherever CR appears in the C source, 13 is substituted in the assembler source output of the compiler.

The last thing that needs mention, is the increment feature. In the code you will see the statement line++; That means to increment the variable line by 1 (NOT 2). It is necessary to use consecutive plus signs to distinguish this operation from an addition.

The only thing that disturbs me a bit about C is that the same symbol is used for different purposes in different contexts in the code. For example, the symbol $^{1}\delta^{1}$ is used between two boolean expressions to represent the AND function of those two expressions. It is also used before a variable name to indicate a pointer or the address of that variable 1 line, for example would represent the address of the variable line, not its contents. Another example is the percent sign which means MOD in an arithmetic calculation, and is used to signal a format description when used in a string in connection with the library function prints, printf ("\$d",number) for example would print the value of the variable number as a decimal number. Since it must make the design of the compiler more difficult to have to distinguish context, I wonder why the designers of C did it that way?

Now, on to Norm Commo's program, Norm was very kind in the comments at the beginning of his program, and I really appreciate his willingness to participate in my column effort, since he has his own to look after too. First I must comment that Norm's use of #define to define constants for the program make it better than my effort in two ways. First of all, PAGSIZ Indicates to the reader of the program what is going on much better than the literal 256. Secondly, this program could be adapted to other applications where it might be desirable to show, for example 128 bytes on the screen, I can think of some systems that don't display long enough lines on their CRT to allow 16 bytes in Hex and ASCII with the spaces between them. The format generated by the program here, is 72 columns wide. It would be useless on a 64 character terminal. With the constants, it is a simple matter to adjust the "parameters" to make the output fit your display.

Notice Norm's interesting way of making comments stand out, by using asterisks as is normally done in assambler programming. The first place where Norm's code is significantly more efficient than my effort is in the two lines: line = -i; while (++line < LINS PER PAGE). Norm has included the incrementing of the Toop Index variable in the test (++line). Of course incrementing the index at the beginning of the loop requires it to be initialized to one less than the first desired index, hence the previous line is line = -i; Norm again used this technique in the next two while loops. He has also made beter use of functions, having written a function to output four hex digits, and one to output two hex digits.

The variable mem is defined as integer, making it 16 bits long. Norm indicates that he did that because of a small problem with the character handling in Duggers C. Probably the one most significant feature of C that I completely missed (or should I say didn't understand at all) is the pointer feature. The use of the pointer and of the logical shift are shown in the line that reads: mem * * (pageadd + (line *
BYTS PER LIN) + bytcnt) >> 8; What's that '*' doing in
front of the expression? We BASIC and Pascal users thought 1#1 meant to multiply! In this context in C, the 141 means "POINTER". That is, the calculated value of the expression is a pointer to the place in memory where the value of mem is to be read. Since mem is an integer, the pointer will point to the high order byte. Norm has used >> 8 to right shift this value 8 places. making the high order byte 0 and the low order byte of the result the value in the desired memory location. I must admit that I hadn't picked up the shift operation either. The loop that includes this line (the first time) outputs the 16 hex values in a line with spaces between.

The next while loop gets the same 16 memory tocation's contents, and outputs them as characters. Here a slight philosophical difference between my program and Norm's appears. He ignores any "character" with a value greeter than \$7F and prints a period, which we both do for control characters (less

than \$20). I've found that one major use of the DUMP program is to scan memory for ASCII text, words or messages. Some programs set the high order bit of ASCII characters as a flag for the program, for example, the first letter of a label, name, etc. If you simply ignore any value with this bit set, you will not make sense of the output. My program therefore throws away the high order bit (which is normally the parity bit for ASCII codes) and prints the character that results from ignoring that bit. You may take your choice.

The program next gets a command from the user. The use of the library function 'tolower' is a good idea. It converts upper case letters to the lower case, so that it doesn't matter if you enter 'F' or 'f', you still go forward by one page. Other than that added touch, the lines that get the command and perform the necessary operation are equivalent to my approach.

We now come to the functions. 'buff' is an array of characters of size BUFSIZ. The library function 'gets' is passed the name and size of the array, and it gets the characters input from the termnal. Again, a ilbrary function "isdigit" as been used to test the character for being a digit. Rather than my if (ch >= 101 or ch <=191), Norm has used if (isdigit (ch)). Here, however, I ran into a problem. Norm had mentioned to me that he had customized the Dugger runtime package a bit. My version doesn't recognize the function 'gets' which I assume Norm added to get a string. I've commented Norm's original line out, and used the scanf function of Dugger's library. Norm will notice that I have rearranged the code after the comment /*
convert to hex */. Apparently Norm has improved the tolower function in Dugger's library. Norm had used ch = tolower (buff[[++]); and then tested with isdigit. I found that the tolower function doesn't check first to see if it is given a valid upper case letter. It tried to convert the ascii digits 0 through 9 to lower case, and in the process made them unrecognizable. (They were converted to the upper case letters P through Y). I simply get the character and test it with isdigit first, and then if it is not a digit, use tolower and proceed with the conversion, I wanted to make this program completely compatible with the Dugger runtime so that we could compare two completely equivalent programs that you readers who have Dugger's C can run, I have noted one other peculiarity with Dugger's runtime function getchar. I get a double character on my terminal. The FLEX GETCHR routine (which is called by the Dugger runtime package in the getchar code) echoes the character, and getchar does too.

At this print, Norm's code follows my assembler version more than the Pascal program. He has defined a couple of functions, put 2 hex (num) and put 4 hex (num) which do essentially what the SBUG roufines OUT2HS and OUT4HS do.

The function puthex (num, nybble) is the most Interesting part of the program, because it is a recursive routine to output the number num, as nybble hex digits. That is, the number and the number of digits to be output are passed to the function. It calls itself recursively in the statement that reads if (nybble > 1) puthex ((num >> 4),nybble - 1); This line causes puthex to be called recursively, each time with nybble reduced by one, until it reaches zero. At that point, the values of num after successive shifts right four times, are all stored in local variables on the stack. They are then successively output by the remainder of the code, which is similar to mine. I had not realized that the AND function (&) is a bitwise AND, or I might have used it for a mask. The AND in Pascal is generally only used for BOOLEAN evaluation, though some implementations allow its use on a bitwise basis too. The statement num >> 4 means to shift num to the right by four places, num in this case is an integer variable 16 bits long. A left shift is also valid. These instructions are very fast ways to multiply or divide an integer number by an even power of two.

As you can see by the finished programs, C allows more flexibility than Pascal and is slightly less wordy. The code generated by the Duggers compiler was slightly less than the code generated by the most efficient Pascal compiler, but Duggers C always compiles the whole runtime package. Which implies that perhaps the C would show a larger advantage over Pascal when used on a larger program, because the code generated per line of user source code may be less.

MORE COMING ON ASSEMBLER PROGRAMMING

As this is being concluded, I have received the first feedback from my February column, in which I asked for some indication of whether you readers want more on Assembler programming and/or Lucidata's implementation of Pascai. So tar, those writing have indicated most strongly, an interest in the Assembler programming techniques, a lesser but reasonably strong interest in the Lucidata discussions, and some interest in exploring C compilers a bit. Several people have expressed interest in my 6809 Arithmetic package too. There were several contributions of information for the Assembler programming series, and we will hit that area hard next month.

```
/ B HEX ASCII DUMP PROGRAM IN C 1/
#define CR 13
#define LF 10
int k, l, m, n, line, page;
char ch:
main ()
  page = getpage();
  ch = 'X';
   while (ch != 'E')
     skip();
     n = page 1 256;
     line = 0;
     while (line (=15)
         k = 16 1 line;
         putchar (hex (page / 16));
        putchar (hex (page % 161);
         putchar (hex (line));
        putchar ('0');
        putchar (' '); /# two spaces #/
        1 = 0;
        while (1 (= 15 )
           m = n+k+l; /# arithmetic overflow OK here #/
           a = getbyte (a);
                               /# assign char value to integer OK #/
           putchar ( hex (a / 16));
           putchar ( hex (a % 16)):
           putchar (' '):
           ]++;
        putchar (' ');
        1 = 0:
        while (1 <= 15)
           a = n+k+1;
           a = getbyte (a);
```

```
if (m > 31) putchar (m);
               else putchar ('.'):
               1++:
            skip();
            line++;
         skip():
         printf ("command? ");
         ch = getch ();
         if (ch == 'F') page = page + 1;
         if (ch == 'B') page = page - 1;
        if (ch == 'N') page = getpage();
     exit();
  5kip ()
     putchar (ER);
     putchar (LF);
  getbyte (add)
     int add;
  tasa
  LDB [0,U] ADDRESS PASSED ON USER STACK
  CLRA
  TFR D. X
             CHAR TREATED LIKE INTEGER WHEN RETURNED IN X
  RTS
 tendase
 getpage ()
    int page:
    char ch:
    int kin;
    printf (" starting page (two hex digits)? ");
    k = 1;
    while (k (= 2 )
      n = n 1 16;
      ch = getch ();
      if ((ch >='0') & (ch (='9'))
            n = n + ch - '0';
      if (( ch )= 'A') & ( ch (='F'))
           n = n + ch + 10 - 'A';
      k++;
   return n;
}
hex (number)
   int number;
(
```

a = a % 120;

```
char ch:
                                                                       meg = $ (pageadd + (line $ BYTS PER LINE) + bytcnt) >> 8:
                                                                       put 2 hex (mem);
  if ((number )= 0) & (number (=9)) ch = number + '0';
  if ((number >=10) & (number (=15)) ch = number -10 +'A';
                                                                    putchar (' ');
  return ch:
                                                                    /# output ascii characters #/
getch () /# unbuffered get character routine in FLEX #/
                                                                    bytcnt = -1;
                                                                    while (++bytcnt ( BYTS PER LIN)
{
‡asm
                                                                       mem = $ (pageadd + (line $ BYTS PER LIN) + bytcnt) >> 8;
   JSR #CDI5
                                                                       if (' ' ( see & mem ( RUBCUT)
   TFR A, B
                                                                          putchar (eem):
   CLRA
                                                                       el se
   TER D.X
                                                                          putchar ('.');
   RTS
∮endas∎
3
                                                                    skip():
 # Bemory.ccc
                 rev: 1
                                                                 skip();
 1 n f commo
                                                                 printf ("command: ");
                                                                ch = tolower (getchar());
 1 created:
                 2/1/82
 # last edit:
                 2/2/82
                                                                 /# decode first #/
                                                                if (ch == 'f')
 1 A program to read what's in memory. Briginally
                                                                    pageadd = pageadd + PAGSI2;
 # written by Ron Anderson. Updated by Nore Commo
                                                                if (ch == 'b')
 I as a comparison between a program written by a
                                                                    pageadd = pageadd - PASSI2;
 # neophyte C programmer versus a reasonably facile
                                                                if (ch == 'n')
 1 C programmer.
                                                                   pageadd = getpage();
 21
                                                                3
                                                             }
#define PAGSII 256
                            /# the size of a page #/
#define BUFSIZ 10
                            /t a tiny line buffer t/
                                                                  /1
                            /# a four bit mask
#define NYBMASK 15
#define LINS_PER PAGE 16
                                                                   # get the page number as two hex digits (the asb
#define BYTS PER LIN 16
                                                                   1 of the address) and return the base address of
#define RUBOUT 128
                                                                   $ the page
#define CR 13
                                                                   1/
#define LF 10
                                                                  getpage()
main ()
                                                                     1
                                                                     char buff[BUFS]21, ch;
   char ch;
                                                                     int i, n;
   int bytcnt, line, pageadd, mem;
                                                                     printf ("\nstarting page (two hex digits): ");
    pageadd = getpage();
    ch = 'X';
                                                                  /# gets(buff, BUFSIZ); #/
                                                                     scanf ("%s", buff);
    while (ch != 'e')
                                                                     /# convert to hex #/
       skip():
                                                                    n = i = 0;
       /# print a page of lines #/
                                                                     while (i < 2)
       line = -1;
       while (++line ( LINS_PER PAGE)
                                                                       n = n $ 16;
         (
                                                                       ch = buff[i++];
         /# print the line address #/
         put_4_hex (pageadd + (line # BYTS_PER_LIM1);
                                                                       if (isdigit (ch))
                                                                          n = n + ch - '0';
         /# output hex bytes #/
                                                                       else
         bytent = -11
                                                                          ch = tolower (ch);
         while (++bytcmt < BYTS_PER_LIN)
            (
```

```
if ('a' (= ch & ch (= 'f')
        n = n + ch - 'a' + 10:
   return (n & PAGSII):
# output 2 hex digits and a space
put 2 hex (num)
   int num:
   puthex (num, 2);
   putchar (' ');
# print 4 hex digits and two spaces
put 4 hex (num)
   int nua:
   puthex (num, 4);
   putchar (' ');
  outchar (' '):
  / t
   # output a hex number recursively
  puthex (num. nybble)
     int nua. aybble:
     int digit;
     /# if not last digit, call again (recursively) #/
     if (nybble > 1)
       puthex ((num >> 4), nybble - 1);
    /# print out the present rightmost nybble #/
    digit = num & NYBHASK;
    if (0 <= digit & digit <= 9)
       putchar (digit + '0');
    else
       putchar (digit - 10 + 'A');
 skip()
    putchar (CR):
    putchar (LF);
```

User Notes

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One of the subtle strong points of C is that there are no predefined functions, such as i/o, as there are in other languages. This statement may seem absurd at first glance. But consider this, if it's not defined, then you can make any function what you want it to be. Mow often have you said to yourself "if only it worked this way". In C you have complete freedom to insure that every function operates the way YOU want it to, not the way that some vendor envisioned most users would like it

Does that mean the the neophyte C user is stuck with a language that does nothing until he write the most elementary i/o functions? Not really. There exists a body of functions described in K&R(1) that are considered standard. All C compilers come with some subset of these or their functional equivalents, and every C compiler for the 6809 that I've recleved so far has included the source code for their library as part of the package.

What functions should you expect to get when you buy a C compiler? That's what we'll cover this in this month's column. Bear in mind that a vendor may not supply all of them, or supply them exactly as they are described here. The descriptions will be taken directly from "The C Programming Language" wherever applicable.

A standard format will be used to describe the functions. It will consist of a call to the function including any required parameters, a type declaration of those parameters, what is returned by the function, and finally, any action done by the function that is not Implied by the previous parts.

TERMINAL I/O

Most terminal i/o in C can be handled by four basic functions. There are a few others, but I would be very surprised if these four didn't comprise 90%, or more, of your terminal i/o calls.

oetchar()

The character from the terminal. returns

action

Gets a character from the terminal. Depending on the vendor, there may be some "filtering" of what actually constitutes a valld character.

qets(s, n) char *s;

Int n:

A pointer to a buffer to be filled. The length of the buffer. Some

ilbraries will not use n.

returns The number of characters actually

put in the buffer, excluding the

NULL terminator.

ection

Fills the buffer pointed to by s with characters from the terminal until <cr> is struck. The <cr> is not put in the buffer, which gets terminated with a NULL. if n is not a paramter of gets() the buffer had better be big enough to hold all the input characters, or something will get clobbered when then end of the buffer is exceeded.

putchar(c) char c:

returns

The character for output to the terminal. Some versions will return c, other

will return garbage.

action Outputs the character c to the

printf(frmt, argi, arg2, ...) char *frmt; The format string. arg1, arg2; Optional arguments, as many as are called for in frmt. garbage returns

Think of "printf" as mnemonic for "print formatted". For Indeed, that is what the function does. The first argument is a string referred to as the format string. Print() reads the string a byte at a time, considering each byte as either a printable character, or a special action character that determines how to handle the next argument in the list.

There are two types of special characters that can appear in the format string. One is the backslash character "\", called the escape character. The other is the percentage sign "\$", which preceeds a "conversion" character.

The backslash is used to denote certain nonprintable characters, or any character that normally has special meaning to the compiler, but must now be taken literally. The common escape characters are

16 backspace

11 for mfeed

newline (Ilne feed) ١ ١

10 carriage return

1.+ tab

backslash

14 single quote (for a character literal)

1 40 double quote (embedded in a string)

bbb / a character whose octal values is ddd

10 null, a special case of \nnn

Some compilers may also include the escape sequences

bbx/

\0xdd the character whose hex value is dd

Which escape sequences are available to you will depend on your compiler. Rightfully, a compiler will translate escape characters into the appropriate byte code. This will remain true whether the escape character occurs in a #define, a character literal or a string. However, some "Small C Complier" derivatives will not. Check your compiler manual carefully. If they don't tell you enough or you're not sure, then write a little test program with the sequence in question and see what the code looks like. Both Dugger and Intersoft, in the first ralease of their compilers, pass escape sequences in a string right through to printf(), where they are then "interpreted" at run time.

The other special character is the percentage sign "\$". It signals that a "conversion sequence" will follow terminated by a conversion character. When printf() encounters the \$ in a format string it takes the next argument in the list and outputs the argument as dictated by the conversion character and any other optional characters in between them.

The optional character occuring between the \$ and the actual conversion character define the field in which the argument will be printed and how it will fit in that field. The allowable modifiers are

A minus sign, which specifies left justification of a string or a converted number in its field.

A digit string, which specifies the minimum field width. A converted number will be at least this wide, or bigger if necessary. A number smaller than the specified field is padded on the left or right. It is padded with spaces unless the field specifier began with a zero, in which case it is zero padded,

A period, which delimits the field specifier from the next digit string.

A digit string which specifies either the maximum number of characters to be printed from a string, or the precision of a float or double.

An "i" (ell), which specifies that the argument is to be taken as a long rather than an int.

The conversion characters and their meanings defined in the standard are

- the argument is printed as a single character
- the argument points to a string that gets printed
- the argument is printed as a signed decimal number
- the argument is printed as an unsigned decimal number
- the argument is printed as an octal number
- the argument is printed as a hex number
- the argument is a float or double and printed as 1-innn.mmm, the exact format is determined by a precision string
- the argument is a float or double and is printed as I-Im.nnnnni+/-lExx, the default precision is six digits
- the argument is a float or double and is printed as \$0 or \$f, which ever is smaller

Any character following the \$ which is not a conversion character is printed as is. Be aware that print() doesn't care if the number of arguments called for in the format string matches the number actually put on the stack. If the string calls for more arguments than were put on the stack then the residue is used, with unpredictable results. Unfortunately, the first release of the intersoft complier used a "*" instead of "%". Why they did that totally alludes me.

There is also an input function called scanf(), it operates somewhat similarly to printf() except in the other direction. That is, it allows formatted input from the terminal. I have never used it parsonally. In fact, I asked a friend who programs in C professionally how often he uses scanf(). The answer was "rarely". However, you may like scanf() so here is a hint at what it does.

scanf(frmt, argl, arg2...)
char *frmt A pointer to the format string. argi, arg2 Optional arguments. As many as are called for in frmt.

returns The number of arguments successfully assigned.

action Converts and assigns the input stream to the arguments, as determined by the format string.

The big difference between scanf() and printf() is that all scanf()'s arguments must be pointers to variables that will be filled with the conversions called out for in the format string. Needless to say, if you pass scanf() less arguments than called for in the format string, you can probably kiss the program goodbye. It will use the residue on the stack, which may be pointing into your executable code! How rigorously scant() requires the input string to match the format string could be dependent on your compiler so I won't say anything more about it here.

CHARACTER FUNCTIONS

The character functions are designed to make manipulation of alphanumeric characters easier.

Isalnha(c)

char c: returns

TRUE if c is an alpha, FALSE if it

isdigit(c)

char c;

returns TRUE is c is a digit, FALSE if It

Isn't.

1slower(c)

char c;

returns

TRUE is c is a lower case alpha.

FALSE If It Isn't.

(supper(c)

char c: returns

TRUE if c is an upper case alpha.

FALSE If It Isn't.

Isspace(c)

char c:

returns

TRUE If c is a "space", FALSE If It isn't. Space is usually defined as either <space>, <cr>, <if>, or <tab > but it will probably depend on your

particular version.

toupper(c)

char c;

returns

The uppercase of c if c is an alpha.

Otherwise it returns c.

tolower(c)

char c;

returns

The lowercase of c if c is an alpha. Otherwise it returns c.

STRING FUNCTIONS

There are five string functions that should be considered as basic to any library.

strcir(s,n) char *s;

int n: returns

A pointer to the string buffer. The size of the buffer in bytes. garbage. This function is not defined in K&R, but should be part

of your Ilbrary.

action

Clears the buffer pointed to by s

to all NULL's.

strien(s)

char *s A pointer to a string.

returns

The length of the string pointed to by s. The NULL is not included.

strcpy(s1,s2) char *s1, *s2;

returns garbage

Copies s2 into s1. The buffer for action si had better be big enough for s2.

'68' Micro Journal

strcat(s1.s2) char *s1, *s2;

returns garbage

action \$2 is added onto the tail of st. The buffer containing s1 had better

be big enough for both both strings.

stromp(s1,s2)

char *st, *s2;

0 If st = s2 returns

< 0 If s1 < s2

> 0 1f s1 > s2

action

si is compared to s2 until there is

a difference between the two, or

either string runs out.

The difference between the last two characters (usually s1 - s2) is then returned. Note that case is not ignored, so "foo" and "Foo" are not considered equal. Also be aware that the string "aaaaa" is smaller

than "bb".

FILE I/O

There are four functions for handling sequential file. These functions tend to be dependent on the host operating system. Much more so than most others.

fopen(filename, mode, fcb)

char *name; A pointer to the name string. char *mode; A pointer to the mode string.

char *fcb; A pointer to a file control block.

Used by Ougger.

A file descriptor (or pointer to cetucos

the fcb) if the open was sucessful,

otherwise a NULL.

Fopen() attempts to open the file whose name is contained in the string pointed to by name. What must be included in the name string depends on whose fopen() you happen to be using. Some versions will not convert the name to uppercase. Others may not assume any defaults.

The mode string contains characters that tell fopen() whether the file is to be opened for reading or writing, and whether it is to be treated as an ascil or binary file (in FLEX).

The file control block pointer, fcb, is only required by Dugger. The fopen() described in "The C Programming Language" doesn't use one. Fopen() supplied by the other 6809 compiler vendors dynamically allocates the necessary bytes. I personally think that this could be a bad practice for FLEX systems. On a memory managed system like UNIX or OS-9 this dynamic allocation poses no problem. With FLEX, it must be done very carefully. The code for one particular fopen() allocated the file control block with the call to the function but didn't deallocate it if there was an error. The block was not deallocated when the file was closed either. You could conceivably write a program that slowly chewed up a lot of memory!

This whole issue of a file control block or file descriptor is EXTREMELY dependant on both the operating system and the particular implementation of fopen(). For FLEX, you can be reasonably sure that the file descriptor is nothing more than a pointer to the actual FCB for that particular file. For OS-9, it would be a "path descriptor". All a file descriptor really really bolls down to being is another logical name for an open file which gets passed to the other file handling functions. The exact "type" of the file descriptor depends on your library. I will assume that it is a pointer to a file control block, which in FLEX is an array of chars.

getc(file)

char "file; A file descriptor for a file that was previously opened for reading.

returns

The next character in the file, or the end of file character, EOF, if the file is empty or there was an

error.

action

getc() attempts to get the next character from "file". The detail of how this is done is hidden from the C program.

NOTE If you rewrite getc(), then It is very important that you don't sign extend any characters on return, since OxFF (from a binary file) would get extended into OxFFFF which is -1, the standard EOF character.

putc(c,file)

char c; The character to write to the file. char *file; The file descriptor of a file that was previously opened for writing. returns c if the write was successful, else EOF on any error.

Note that putc() from some of the libraries may fail to return c, all should return EOF on error. However, putc() is defined as returning c in K&R.

close(file)

char file; The file descriptor.
returns The file descriptor if the close successful, EOF otherwise.

So there you have it. These functions will let you do quite a bit in C. You can also use them as a base for writing other functions. For example, say you want to write a function called streq(si,s2) which returns TRUE if si is equal to 22 and FALSE otherwise. You could just pass the parameters on to strcmp() from within streq() and then return the logically inversion of what strcmp() returns.

PEN-IN-MOUTH

Now we come to a part of the column where you get to laugh and I get to cringe. Hopefully this will not be a monthly feature! Seems that I blew a few things in the second column. I noticed most of them. But too late to get the changes into print. 68 Micro Journal reader Jim. Howell of San Jose caught one of them. Thank's Jim. Feedback is good, even when it's not complimentary! So here are the bloopers.

mistake #1

An array of fifty int's is declared as int arrey1501; The indices then range from 0 to 49.

mistake #2

The two dimensional array in the function translate() is en array of POINTERS to characters, not characters. I stated that much in words, but the declaration was missing the pointer designator. It should read as static char "number[2][5];

mistaka #3

The fixed Indices used in the scanning code for the same function were off by one. The code should have read

Once again, if you catch me in an error beyond simple spelling or grammar, then let me have it with both barrels! You will keep me honest and on my toes. You will also be doing a service to the other readers. Please don't take this to mean that you can't send in letter's of encouragement and suggestion also!

WRAP UP

I have recently gotten OS-9 up and running on my system, and Microware's C compiler should be coming along shortly. So far I like what I see of the system. I suspect that OS-9 and C will make a very potent programming environment.

I had a couple of Interesting phone calls this week (late March). One was with introl and the other was with Dugger.

Introl has fixed up a bug and made a few improvements. The bug was the lack of a maximum error count which let the compiler eat up stack space as errors accumulated until it finally crashed. They have made inprovements to the error checking of the compiler, improved the error handling of the linker, and added two communands to the librarian that make life a lot easier. Introl is now working on an OS-9 version of their C compiler.

Dugger filled me in on some of the improvements of release \$2 over release \$1. Types floet, double and long have been added. The compiler now outputs position independant code and converts escape characters into byte codes. The FOR and DO WHILE loop statements have been added, as have the logical NEGATE, OR and AND operators; "!", "%" and "&&" respectively. The complete set of assignment operators are now available too. The compiler did get bigger. You will need 32K to compile any reasonably sized program. Dugger is also working on an OS-9 version of their compiler.

Next month we'll go over ways to make life easier when you you're using a compiler without a relocating assembler and linker, and what some vendors have done to help you along these lines. I will also include a crude bench mark of the Dugger, intersoft, Word's Worth and introl compilers based on the Eratosthenes Sieve prime number algorithm. This code for this algorithm was taken from the September, 1981 issue of BYTE magazine and then modified to run on the Dugger subset of C.

COLOR User Notes

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QUICK LOOKS:

We have received a couple of items from Pete Stark of STAR-KITS (see Advs. In this Magazine) for the Color Computer. Pete has set his excellent SPELL IN FIX program up to run on the EXATRON FLEX Conversions (i.e., moved it above the Display Screen Memory area). He also now has it available in Radio Shack Disk Format, for those that don't have the FLEX Operating System. And, of course, the normal FLEX9 Version of the program will run without modification on the 64K/Radio Shack Disk Controller FLEX Conversions being soid by DATA-COMP and Frank Hoggs. This is a "request the information" type of program that is extremely easy to use. The programs' "prompts" are clear and easy to understand, and the documentation for the program is excellent. See page 31 of the Feb 182 Issue of 168° Micro Journal for a full review.

The other product we have been using from STAR-RITS is his HUMBUG Super Monitor for the Color Computer. This is available either on Tape or Disk (R. S. Format - \$39.95) or in a ROM Pek for \$69.95. Again, the Manual is

excellent, and includes a full Source Code Listing of the program. HUMBUG contains 37 different two-letter Commands which allow the normal Memory examine and change operations including ASCiI and HEX Dumps, Changes, Examines, Checks, Tests, and even MV for Memory View. You can also Analyze, Load, Punch (write), Save, etc. with Tape; play with the Registers; operate as a Terminal in Full or Half Duplex; handle the Printer and Baud Rates; etc., etc., etc. it provides a Disassembler Dump, Fill and Move Memory, and Single Stepping through programs with full Breakpoint features. A couple of unique Commands I haven't seen tell you Where Humbug Is (WH) and allows you to Move Humbug (MH). These are extremely handy when running a Memory Test; you can test up TO Humbug, move Humbug down, and test on up: NiCE. In general, it is an EXCELLENT Monitor; we will have a full review on it in a later issue.

Another OUTSTANDING product we have been using is a Lowercase Adapter for the Color Computer from Micro Technical Products, inc. Again, see the Adv. In this Issue. This is an Adapter Board that contains a ROM and the circultry to automatically switch it on when you select Lower Case Characters (with <SHIFT-0>); no wiring or circuit mods are required. The MC6847 Video Display Generator is removed from it's socket and the Adapter Board plugs into the Socket just emptled, then the 6847 is reinstalled in a socket provided on the board. The pins that go into the normal VDG Socket are formed like norma! IC Pins and long enough to seat solidly; there will be no problems with the socket pin receptacles being bent out of shape from forcing thick pins into the sockets, or having the Adapter Board "pop out" because you just couldn't press it down deep enough. The Character formation of the letters is also excellent. Another SUPER Feature of this Lowercase Adapter Is that there are two switches on the board; one switches the ROM on or off (when off, you are back to the normal Display Screen), and the other switch INVERTS the colors on the Display. We immediately set ours for a Black Screen with Green Characters and LEFT IT THERE - a true "Green Screen" Display. This is another EXCELLENT Product for the Color Computer, and is competively priced at \$75.00. Order them from Micro Technical Products or DATA-COMP; I'm sure you won't be disappointed.

I have received several requests for information on some type of board that can be plugged into the ROM Pak Slot to allow wiring your own circuit for the Color Computer. We received a unit called the PROTUPACK from Atomtronics (3195 Arizona Ave., Los Alamos, NM. 87544) the other day. This is a PC Board about 4" sq. filled with holes on a 0.1" grid. One side of the Board is completely plated with the plating relieved around each hole which acts as a Ground Plane; the other side has plating for each hole. The Board "Edge Connector" is Gold Plated, and the +5 VDC Line (from pin 9) is continued around the Board to provide a Powor Buss. The documentation provides a listing of the ROM Connector's pinouts and some suggested circuits for wiring a 6821 PIA, EPROMS, 2114 Static Memorys, etc. Also included is a discussion of the Color Computers' Power Supply limitations. Finally, a Plastic Case is available which houses the Board to protect it from the "elements" (paperclips, staples, resistor leads, etc.; all those things that are attracted to a Circuit like magnets). The Board sells for \$24.95, or \$32.95 with the plastic case. A "Tinkerers Dream"!

COMPUTERWARE has been providing excellent 6800 and 6809 support for a while, and they have numerous excellent products available for the Color Computer. Their product line includes both Hardware and Software (I'm sure you have seen their Advs. in this magazine). They also provide an informative 'newsletter' about their products; if you are not on their mailing list, drop them a line. I would like to mention a couple of their products here. The first is a product which should be a part of every Color Computer Owners inventory; the COLOR DATA ORGANIZER. This is a small "Oata Base Management"

type of BASIC Program on Tape which allows 2 Alphanumeric fields and 2 Numeric fields of information access and storage. Its capabilities are similar to Radio Shacks "COLORFILE", but, since it is written in BASIC, you can "mold" it to your own needs. It can also be converted to Disk when you get that capability. Besides being able to change Printing Formats, Display Formats, Record Formats, etc., It also provides a good example of the use of BASIC in both Programming and for something besides playing games (which is not that BAD).

The other Product from COMPUTERWARE is the first "Disk Based" Textprocessor, in Radio Shack format, to hit the office; COLOR SCRIBE. COLOR SCRIBE comes on Disk and requires 32K of memory. The package sells for a very reasonable \$49.95 and Includes the Disk and an exceptional, attractive Manual. I call It a "Textprocessor" because that Is what the Program Is; an excellent "Line Editor" with a full range of "Formatting Commands" that are inserted at the beginning of a line of text which control the output of the Text when it is "Processed". This formatted output can be directed either to a Printer or to the Screen. COLOR SCRIBE has two modes while inputting text; the INPUT Mode and the COMMAND Mode. Text is entered in the INPUT Mode, which furnishes automatic line numbers: these are used for reference while manipulating text only; programs such as BASIC which need line numbers must have them entered following the Editors Line Number. The full range of Text Manipulation is supported including extrasilke "selective change", Macro Commands (which allow defining a command or series of commands which are activated by a single key-press), etc. The Formatting capabilities support such advanced features as Headers and Footers with automatic Page Number insertion, Fill and No-Fill Modes, Centering, positive and negative indentations, The full range of Tape and Disk Handling commands are supported, as are a few "Special Color Computer" commands such as "RV" for Reverse Video to make the Display more 'useable' when it contains mostly Capital or Lowercase letters. This program will probably be the "Most Used" program you own because it is used for Programming, Word and Text Processing, etc. An excellent program.

MORE on R. S. DISK CONTROLLER with FLEX

By now both DATA-COMP and FRANK HDGG LABS should be shipping their FLEX9 Conversions for operation with the Radio Shack Disk Controller. This package should prove to be the "Standard" Operating System for the Color Computer for several reasons.

- 1. This system allows maximum use of the 5 1/4" Disk Drives available to the normal Color Computer User. The WD1793 Disk Controller Chip used in the Radio Shack Disk Controller allows Double Density storage on the Disk. Both Conversions offer Double Sided capability through the use of the Drive Select 3 Line. The combination of these two factors allow 1404 Sectors of storage on a 40 Track, Double Sided Disk Drive, or just under 400,000 (Formatted, meaning USEABLE) bytes of storage. With the "state of the art" on Disk Drives at the present time, this is probably the most "dollar efficient" and reliable mass storage available for the average Color Computer User.
- 2. This system allows COMPLETE compatibility with the Radio Shack Disk System (in fact, you really have TWO COMPLETE Disk Operating Systems). As good Software begins to show up for the Color Computer, you can have "the best of both worlds". The FLEX System allows the use of the large amount of good Business Software available for serious use on the Color Computer, and the Radio Shack System allows the use of that type of Software as it begins to arrive.
- 3. I haven't seen the FRANK HOGG LABS System yet, but the DATA-COMP Package eliminates several of the

Color Computers' natural limitations. The full 128 ASC!I Character Set Is provided through the use of a "CONTROL" Key and "User Definable" Keys (an "ESCAPE" key Is also provided), and four different Display Screens are incorporated, including 42x24 and 51x24 Display Formats with normal lowercase. Both of these Screens are very useable, and considerably reduce the Display ilmitations of this computer.

4. The General Software available for the FLEX Operating System Includes an extremely POWERFUL and FAST Business BASIC in TSC's XBASiC, an excellent Macro Assembler, a powerful Line Editor (Computerwares' COLOR SCRIBE, mentioned previously, is a small version of this system), and an EXTREMELY POWERFUL Text Processor, to mention a few of the Software Products that form the basis of a Powerful Computer System. For the Programming types, I have been running TSC's PASCAL; SWIPC's PILOT; Ouggers', Introl's, and Words Worth's C Language; all "straight out of the box", so to speak. In general, if the Program uses the normal FLEX I/O Vectors, it will run on this system, if you have enough Disk Storage capacity.

All is not roses, however. First, we have been looking into the RAM situation these past several weeks. Out of FIVE (5) sets of the Radio Shack 32K RAMs that we have checked, only one set came up as good 64K Chips when the unit was first modified, and they didn't last a week. EVERY set has had fallures within a week and all but one set still averages losing a Chip about every week. In short, WE have not seen a set of Radio Shack 32K RAMs that were 6000 64K Chips. We have been using the T14164 series Chips with good success on the Color Computer. The Refresh requirements of this RAM Chip are different from the normal 4116 or Motorola 6664/5 type chips, but they work fine since there are plenty of extra Refresh Cycles provided with the Timing used in this Computer. NEDORY is NOT the place to "save a buck" where reliability is concerned; MAKE SURE THOSE RAMs ARE 6000 64K Chips.

The other problem you may face is in the Disk Drives. Again, "you pays your money, and you takes your chances". The first problem that may appear is in the area of the "Double Density". THE DISK DRIVE DETERMINES whether your system will work with Double Density when using these FLEX Conversions with the Radio Shack Disk Controller. The SOFTMARE supports Double Density, but if the Disk Drives' Read/Write Head and Electronics are marginal, you are heading for trouble with Double Density. Most of the Late Model Disk Drives can handle Double Density with no problem because of recent advances in technology, primarily in the Head Design Itself. The Radio Shack Disk Drive for the Color Computer is an excellent product and will give no problems in this area; TEAC, Tandon, Qume, etc., all have units that operate reliably in the Double Density mode. Again, you get what you pay for.

If you want to make use of the Double Sided capabilities of these FLEX Conversions, you will need to replace the normal Radio Shack Disk Drive Cable because they accomplish their "Drive Select" with the Drive CABLE, not in the Disk Drive like every one else. If you look at the Drive Connectors on a Radio Shack Cable, you will notice that several connector pins are missing. They "Select" a Drive by only installing the appropriate Drive Select Line to that particular Drive; e.g., the connector for Orive 0 ONLY has a pin installed for the DS O Line, the connector for Drive 1 ONLY has a pin installed for the DS I Line, etc. Their DISK DRIVES have ALL OF THE DRIVE SELECT LINES ENABLED. Their Drive 0 is also SPECIAL; it has the Terminating Resistor pack BUILT IN. That is why that Drive ALWAYS goes in the CASY DRIVE POSITION. So; we have a Cable that does MOT have a DS 3 tine, on Drives that DO NOT have "Drive Select" jumpers.

To use the Double Sided Drives with these Conversions, you must provide the OS 3 Line to ALL of the Drives, because IT is used as the Side Select Line. DATA-COMP, for one, has Disk Drive Cables available with ALL of the lines installed (be sure to specify this type of Cable when ordering a system from ANYONE). Also, If you are using one of these cables on a Radio Shack DiSK DRIVE, you will have to MODIFY THAT Drive by cutting the PC Lands for all of the Drive Select Lines EXCEPT the one being used (all other Disk Drives provide a "Jumper Block" to accomplish this).

Now that we have the OS 3 Line going iNTO the Drive, we will have to MODIFY the Circuit Board in the Disk DRIVE itself. Since no Disk Drive Manufacturer had the foresight to provide a "Jumper Block" to enable using the DS 3 Line for Drive Select (it WOULD take a HIGH QUALITY Crystal Ball to foresee this requirement; we only run into these kinds of problems when working with Radio Shack), we must provide that capability ourselves by replacing the Side Select input with the OS 3 Select input. Normally, this is accomplished by cutting the Side Select PC Land and jumping the OS 3 Line to the Drive side of this cut. All that is left is to determine how to set up the rest of the jumpers; for instance, on the TEAC Model 50C's, we had to enable the "MX", the appropriate "DS" line, and the "HS" line, to get them to work Double Sided. Next month, we'll try to summarize the mods to some of the normally used Drives.

The FLEX Conversions by DATA-COMP and FRANK HDGG LABS provide the Software to make the Color Computer a powerful Computing System, but YOU will have to provide the RAM and Disk Systems to allow maximum utilization of this potential.

--- RLN ---

NIXON VID Brd

NIXON NESOO2A CRT Display

For those users who operate with the Motorcia Exorcisor systems this review should be good news. For as iong as I can remember, if you were on a Motorcia system bus you did not have as wide a variety of vendors (boards, software, etc) to choose from. The Motorcia components are fine but the price and sometime availability were something else. No doubt the Exorcisor system is a fine development system, but then there are those of us who have opted to use ours for applications as well. The choice of software and support hardware becomes somewhat more narrow. Also the price is a major factor. The NiXON Engineering Company offers a full 'Exorcisor' development system, and at very attractive prices.

NIXON Engineering Systems are packaged in two very attractive cabinets. The disk drives are housed in one rugged and stylish 'Moduline' industrial grade cabinet, the computer in a matching cabinet.

The NIXON Exorcisor system consists of 5 or 8 inch disk drives, a 6809 CPU card, 56K of RAM and I/O. The standard system includes a 10 card cage. Expansion room is more than sufficient for additional ports, not including the normally supplied two serial ports available at the back and the two parallel ports that are also available. The power supply is a 'Boschert' switching power supply of rugged design. The system is truly an Exorcisor compatable system both from the hardware and software angle. The price is certainly right, a complete system with dual double sided 5 inch drives sells for less than \$5,000.

Before detailing the video board a few things merit mention. The disk controller, which is a double sided configuration, can drive four SA-800 and three SA-400

type disk drives with selection of all seven always on line, sells in the \$395 range as does the video board. Compare the features and then the price and the NIXON system becomes very attractive (a savings of one half to two thirds).

The NESOUZA CRT DISPLAY MODULE appears to the system as a 4K static memory device. It generates 84 characters \times 24 lines with an optional 80 \times 25 display. all 128 characters are formed in a 7x9 dot matrix. Also 16 different combinations of background/underline character positions allow a high degree of system display flexibility. It drives both composite and separate syncronizations devices. The display by being synchronized to the system clock provides a glitch-free display between the CPU and system display.

FEATURES

- 1. Upper and lower case.
- Shifted lower case (extenders) for (j,y,q,p etc.)
- 3. Background/underline control for each character using upper 2K memory page for control
- 4. Upper 4 bits of control page available for other software use
- 5. TTL level horz. and vertical sync outputs (positive true)
- 2.5v P-P video out with adjustable halftone level
- 7. Clock normal 1.0 MHZ 2.0 MHZ optional

Addressing: Base address is switch selectable to any one of the 16 4K positions in the 64K field.

The video board is now available and adaptable to the Motorola VERSA® bus by using the VERSA bus Exorcisor® adaptor.

The very popular FLEX" disk operating systems is also available for this system. NIXON ENGINEERING furnished a set of overlay drivers to enable the system as a full FLEX controlled computer, great for running all those applications and other software advertised in 68 Micro

Additional Information and availability can be secured from:

> NIXON Engineering Co. 578 Menker Ave San Jose, CA 95128 a/c (408) 371-4573

2 MHz PROM

SWIPC EPROM PROGRAMMER

It came to my attention some few months back that SWTPC had developed additional software for their EPROM programmer. This was an in-house project and also is furnished with later versions of their FLEX".

Realizing that there are many of you out there who have this unit but do not have the latest software to use it at 2 mhz, or utilize most of its other nice features, I called Dan Meyer, President of Southwest Technical Products and after discussing it with him he agreed to allow me to supply you with the software in binary on the 68 Micro Journal 'disk sales' offer found elsewhere in this Issue. We all say 'THANK YOU' to Dan Meyer and the folks at SWTPC for their willingness to allow us to furnish you their software on a near cost basis.

The programs allow you to read, write to disk 2716, 2532 EPROMS and also checksum each one. And even more Important they allow programming at up to 2 mhz both 2716 and 2532 5v type EFROMS.
We have prepared a short instruction sheet on their

use and will supply one with each disk requested.

Please bear in mind that because of the individual handling of each of these type of request we will supply only as we have it and the instructions assume you are contident in your computer and it's software capabilities and it's operation.

Thanks again Dan and all you fine folks down at SWTPC.

DMW - - -

RECEIVE BREAK CIRCUIT

J. Gary Mills 1019 Weatherdon Ave. Winnipeg, Manitoba R3M 2B5 Canada

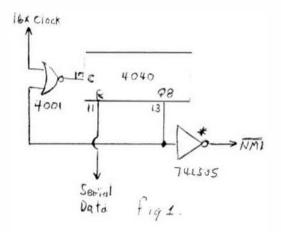
This article describes a simple addition to a serial interface card which is used to detect the signal generated by the break key on a keyboard.

The break signal from an ASCII key-board is simply a long space signal. During transmission of normal characters, short spaces occur, but there is always a wark level at the end of each character. The break signal is generally timed (230 us is a common choice), but some terminals transmit a continuous space as long as the key is depressed. The break signal can be detected by the computer hardware, and used to generate an interrupt signal.

With the 6800 series of MPUs, an interrupt is initiated by applying a logic low to the NMI (Non-Maskable Interrupt) line. The MPU then completes execution of the current instruction, saves the register contents on the stack, and begins execution of the NMI service routine.

The circuit shown in Figure 1 is based on a CMOS 12-stage binary counter. The counter is reset during a mark and counts up from zero during spaces. When a long space occurs, the count reaches 256 and the Q8 output goes high. A single inverter is required to drive the NMI line. This should be an open-collector inverter if any other devices are connected to the NMI line. The nor gate causes the counter to remain at a count of 256 as long as the break signal is present. When the mark level returns, present. the counter resets to zero.

I am using MIKBUG version 2.0 in my system. This monitor responds to an NMI interrupt by printing a B on the terminal and then displaying the register contents from the stack. I can then use all the commands of the monitor to continue the commands of the monitor to continue debugging the interrupted program. Some earlier versions of MIKBUG do not have this feature. However, most versions maintain the address of the NMI service routine (two bytes) at A006 in the system RAM. This means that you can include a service routine in your own program and place its address at A006. The actions performed by the service routine are up to you, but generally it is a good idea to begin by reading the ACIA to clear out the garbage characters generated by the break. There are only a couple of ways to return to the interrupted program. One way is to set a flag to indicate the break and then issue an RTI instruction to return to the point of interruption. The other way is to reset the stack pointer and then branch to a different portion of the program. portion of the program.



PRODUCT REVIEW

DATA SYSTEMS-68 DRAM-64K MEMORY BOARD

:by the '68' Micro Journal Staff

We have been evaluating a product from the heart of the "Eastern Silicon Valley" (Central Florida) the tast couple of weeks that will warm the hearts of many of the SS-50 type 'experimenters'. In this case, the 'ProducER' goes by the name of DATA SYSTEMS-68, located at 2316 Diversified Way, Orlando, FL. 32804 (see Adv. this issue). The 'ProducEE' is a 64K Dynamic Memory Board, appropriately named the ORVAM-64K, available either with or without "population" (parts to you newcomers). The Board is extremely well made, consisting of a 1/16" G-10 Glass Board measuring 5 1/2" by 9" for the 50 pin stot. It is a Double Sided PC board with Plated-through Holes, Solder Masked on both sides, and a fully Silkscreened Component Layout on the top. The PC work is professionally done, and appears to be 2 oz. Clad with a 'healthy' pre-tinning. The component layout is 'spacious' due to the use of LSI's for Refresh, and the Silkscreening provides the parts VALUE, not reference (e.g., 22K, 74LS245, etc.), which means the complete Board could be assembled without referring to the Instructions (which are very complete).

The Board Is designed around the Inexpensive, but "old reliable", 4116 Memory Chips; and the Motorola MC3242 - MC3480 LS1 pair to keep them Refreshed. It also eliminates any timing problems by using the 0447-0250-01 Delay Line Chips Instead of adjustable one-shots. This design yields several advantages: It allows a relatively spacious layout when compared to boards using TTL for Refresh; It uses parts with proven reliability and low cost; and It eliminates any adjustable components, increasing reliability that much more. Just install the parts (correctly) and it is ready to go.

The DRAM-64K Memory Board is a high-quality PC Board which can be populated primarily from parts that inhabit most any "parts bin". The "specialized parts such as the two Motorola LSIs, the Delay Lines, and the Molex Connectors are available directly from DATA SYSTEMS-63, along with the Board. The Memory Board is designed to run on both 6800 and 6809 Systems at 1 Miz, and includes an eight position DIP switch for enabling memory in 2K increments along with extended addressing capabilities. Now for the best part; the DRAM-64K Bare Board costs a whole \$39.95. Allowing around a hundred dollars for the parts, you could put together a bank of 64K Memory for around \$150 (remember what that much memory cost a couple of years ago?). DATA SYSTEMS-68 has several more projects "in the works"; if this is any indication, they are going to be "warmly welcomed" by the SS-50 crowd. An outstanding Product and an outstanding Price.

DATA SYSTEMS '68'

Dedicated to the Abandoned Hobbyist

In 1979, Jack Morrison, president and owner of Central Florida Circuits (CFC), a company specializing in the manufacture of high-quality prototype and limited production printed circuit boards, and his personnet director, Tony Montgomery, began to explore the avenues available to them in computer sciences.

Mr. Montgomery, a 6800 user, brought his own Southwest 6800 in and demonstrated the usefulness of a computer to Mr. Morrison on both the business and personal level. Mr. Morrison got hooked on the old "Space Voyager" game. They decided to set aside ample space and funds to further study the 6800: what had already been done, what was being done and, more importantly, what could be done in the future. Contact was made with the local 68XX users' club. A few of the more sophisticated engineers and hobbyists in this club began feeding ideas and suggestions to CFC. The main objective was to make the 6800/6809 a more versatile system.

In May of 1980, the project became so time and labor intensive that CFC formed its own research and development department to handle the load. During the next 14 months, R & D built an extremely large Inventory of computers, PC boards, programs and test equipment. Fortunately, any custom PC boards that were required for this research were manufactured in house by CFC.

In July 1981, R & D had grown to the point where it required its own building and staff. Several of the engineers and hobbyists who had been working with CFC all along were hired and the core of what would soon be Data Systems '68' was formed.

Data Systems '68' offers PC boards for the 68XX user of unequalied quality and design. All DS-68 boards are solder masked on both sides. All nomenclature is silk screened for ease of assembly. Data Systems '68' documentation is the best in the industry (over ten full pages of documentation on some boards!). With 17 boards available this year and new products still in the testing stages, Data Systems '68' is the brightest new name in the world of the 68XX user. A new main frame system will be unveiled at the Atlanta ComputerFest on June 12. The new Data Systems '68' stand-alone terminal will also be shown. It features a 12" CRT, 1.5 megabites of storage and 56K of usable memory.

Data Systems '68' Is a company dedicated to you, the 68XX user. They welcome ideas, suggestions and opinions from all. In the months to come, watch for more exciting products from this dynamic new company.



-- RLN --

tFORTH

Talbot Microsystems 1927 Curtis Ave Redondo Beach, CA 90278 (213) 376-9941 April 9, 1982

Don Williams, Publisher '68' Micro Journal Hixson, TN 37343

Dear Don,

Many readers probably have wondered whether the FORTH community is just blowing not air over the advantages of FORTH, or whether there are any facts to substantiate the claims that FORTH produces code which is both compact and fast. On the issue of speed, there are two points to be addressed: speed of the programmer to develop code, and speed of execution of that code.

On programmer speed, there is to my knowledge no hard data, just a common "knowledge" in the FORTH community that productivity with FORTH is high. From personal experience, I know that for laboratory work involving one-time throw-away code! routinely do in 10 seconds what would require me 5 to 15 minutes to do via the usual editor — assembler/compiler — load — execute route with assembly language or BASIC, PASCAL, or FORTRAN. I have had customers of firmFORTH comment that they were able to develop 8-16k target rom codes 3-10 times faster than previously using assembly. PASCAL and other language proponents will immediately point out similar gains when moving to their high level language, but these users generally comment that those other languages do not provide the flexibility, power, or interactivity of FORTH, and that they need compact and fast code which those other languages do not provide; i.e, the requirements of the job force the decision to be assembly or FORTH.

On the actual code execution times and memory requirements, there is firm information. The prime number benchmark of Anderson (July '81 MJ) has been used to compare the various 6809 implementations of PASCAL (Nov '81, and April '82). I have coded the equivalent in FORTH and present the results in the accompanying table and graphical representation. (Note: the April '82 times for OS9 have to be doubled for proper comparison: it is improper to compare software using hardware with different cpu speedsi My table has all times adjusted to a common iMhz cpu). There are some subtle aspects which I do not have sufficient information to discuss; e.g., the firmFORTH code is completely self contained and rommable, but I do not know about the PASCAL's. I suspect that some of them are also, but it is also likely that some of the PASCAL's use host operating system calls to do terminal I/O. If I use FLEX IO calls for all terminal I/O instead of internal runtime code, the firmFORTH total byte count drops to 1075 bytes!

Conclusions: FORTH is significantly faster than any current p-code 6809 implementation of PASCAL, and only about 25% slower than native code PASCAL's. The code produced by firmFORTH is much much smaller than most PASCAL's, in fairness, it must be pointed out that firmFORTH is integer only, and so without extensions is is generally regarded as being useful mainly for applications such as instrument controllers, data acquisition, and process control. Of course, those are generally the situations where compact rommable code is of importance anyway.

As a point of interest, for the same benchmark run with the full tFORTH complier/interpreter rather than the runtime package, the number of user bytes and total bytes are 382 and 9887 (speed is same as firmFORTH), Tiny PASCAL has been written in FORTH (PASCAL compiles into the internal FORTH code) and for this the parameters are 716 user bytes, 16,826 total bytes, and 192 seconds, 17k looks high compared with the numbers in the table until you remember that this 17k includes the full FORTH compiler/interpreter as well as the PASCAL compiler/interpreter and then the application itself! I do not know the sizes of the various PASCAL compilers, but I dare guess that they are larger than this! The PASCAL-in-FORTH compiler was never intended to be a production tool (straight FORTH is better), so it has had no optimization efforts applied to try to speed it up. It does, however, provide a very unique and powerful learning tool because you can easily intermix PASCAL, FORTH, and assembly code, and test code immediately.

QUICKSORT

by HL Harkness

Here is the sort routine I put off for later back when I did my linking loader. Since, at this writing, I have recieved no orders for my loader, anyone who sends for it will get the version with the sorted symbol table feature.

I agonized for a while on just what algorithm I was going to implement for my sort. For short lists, namely any that are likely to fit into main memory of a micro system, nearly any old sorting algorithm is OK. I started to do a bubble sort, but when I got started, I saw that it was actually a little more complicated than some of the better sorts.

I read through the section on sorting in Software Tools, by Kernighan and Plauger, and decided to do the quicksort by C.A.R. Hoare instead.

Quicksort is really kind of neat, but I wasn't sure I understood the Algorithm. Knuth's <u>Sorting and Searching</u>, (Vol. 3 of his series, <u>The Art of Computer Programming</u>) was a little more help. Both of these references gave very detailed non-recursive routines for quicksort. Since the 6009 is well-endowed for recursion, I decided to use recursion anyway. I studied both references at great length until I convinced myself that I could write it.

Quicksort had yet another attraction for me. I first encountered it back in school in a class on LISP taught by none other than Dr. Siklossy'. I failed that course. Miserably. And Quicksort was one of the things that gave me the most trouble. I just couldn't convince myself that such an algorithm would even work — I certainly couldn't make it work in LISP. So, to settle sn old score, I wanted to prove I could do it.

It seems so simple. All you do is pick an arbitrary entry in the list, and

re-arrange the list so that all entries which are larger come after that entry, and all entries which are smaller come before it. Then you repeat that process for both of the lists on either side of that entry. When you get to a sub-list which has only one entry, that entry is already in the proper location in the list. (Trust me)

If you are like me, however, the recursion part is difficult to follow. I think perhaps that is because the very first language I learned was FORTRAN. The recursive description in K&P is only ten lines long, and yet it must have taken me three days to get it straight.

```
SUBROUTINE QUICK(V,I,J)

IF(I>=J)

RETURN

PARITION THE ELEMENTS V(I)...V(J) SO THAT

V(I),V(I+1)..V(K-1) <= V(K) <= V(K+1)..V(J)

FOR SOME K SUCH THAT I <= K <= J

CALL QUICK(V,I,K-1)

CALL QUICK(V,K+1,J)

RETURN

END
```

I've plugged <u>Software Tools</u> and <u>Sorting</u> and <u>Searching</u> (vol 3) a couple of times now, yet they deserve another mention. Anyone seriously interested in programming should have both of these books, so if you don't, you should drop everything and run down to your local computer store and get them both. And I do mean all three of you.

As it turned out, I had absolutely no problem with the recursion. It was so simple that I even went back and did the extra calculations to make sure that I always sorted the shortest sublist first (see comments in listing). The things I did have some problems with were an instruction that didn't quite do what I expected, and some pointers which were hard to keep straight. In real life, I work in a 16-bit world, and the mixture of 16-bit and 8-bit quantities in '09 code sometimes throws me.

In the integration process, I uncovered a mistake in SCOMPR, and I changed the call to SORT in NTERPS slightly, so I am including the altered listings in addition to the three routines written for SORT.

The loader's hierarchy chart given in my last installment is now amended to include:

NTERPS Interpass process
SORT Sort symbol table
SCOMPR Compare strings
EXCHAN Exchange strings
COPY Copy string

The next logical improvement to be made on RLOAD is to organize the load map to make it take up less paper and make it easier to read. However, I am now proceeding to write some data base routines I had in mind when I wrote SORT. After all, the only reason for

having a tool like RLOAD is do some useful work with it. When I get tired of the way it works, I will sharpen it some more...

Please address orders or inquiries to Word's Worth, Box 28954, Dallas, Texas 75228.

```
7-19-81 TSC ASSEMBLES
MTERPS 7-19-81 TSC AL:
Author: SL Harkmann, Placed in Public Domain, 1981.
  0000
                            HODOLE 'HTERFS - FLOAD Vers 2.1 '
                             • INTERPASS PROCESS
                               In the final version, this module will Produce a sorted aymbol table listing and
                               surved symbol thole listing and until point out undefined seternals. In the interest of brevity and time, the intial (bootstrap) version will merely dump the table.
                               . . . . . . . . . . . . . . . . .
                            *REY2.1 Changed calling sequence of SORT to use length of key instead of column numbers 15JUL51 HLM
                                      . . . . . . . . . . . . . . .
                                       EXT
                                                 NTERPS
  0000
  D002
                                                SYNT AB
                                       EXT
                                                 PSTRR
  8000
                                       EXX
                                                 OUTHEX
                                       EXT
                                                PCRLF
                                       SO T
                    0006
                           FOCL EN
                                                              ENTRY LENGTH
                                      EQ 11
                   003D
                                                 $3D
                                                               -SIGN
                    000C N177 PS
                                      POU
  000C AD
000F 30
0013 AD
0016 AD
                                                 [PCRLP,PCR]
                                       JSR
                                       LEAT
                                                 HSG . PC
                                                IPSTRUG.PCR
                9C F0
                                                 PCRLF . PCR
                                       J58
  0019 AE
001C 36
001E AE
0021 36
               8C B6
                                       LDI
                9C DF
                                                 [SYOUND, PCR]
                                       LDX
                                       PSHU
                                                 I SHECKEN
  0023 86
                                       1.04
                                       PSHU
LDA
                                       LDA
                                                 #.S2.#D(
                                                              OREV2.1
                                                [SORT, PCR]
                                      the symbol table
LDI SYMTAB, PCS Point to top of table
  0032 AE
               ec ct
                   0035 PRSYN
  0035 36
               10
                                                STRING, PCR
                80 0049
                                       LEAT
                   • Copy the symbol to output buffer
  0030 A6
003P A7
0041 5A
                AD
                                       374
                                       DECR
  0002 26
               F9
                                                COPY
                              Terminate the atring.
  00 to 86
                                       STA
  0048 86
                                       LUA
                                                 AFOS.
  004A A7
                                       JSR
                                                 [PSTHIG, PCR]
                             Get the address of the symbol FULD I
  0053 37
0055 C6
                                       FULT
                                                 #SL DI
  0057
                                                 [OUTHER, PCR]
                                       LEAY
               9C A8
                                                 TOUTHER, PCR 1
  DDSD AD
  006 0 30
                                                 1.I Now Pointing to next entry ISTOCKHO, PCR] If there is one
                                       OLT
                                                 PRSYN
  0067 AD 9C AD
                                      JSR
                                                [PCRLF.PCR]
  006A 39
                                       RTS
  006B 20 ZA 2A 2A
                                                " BOOD STOROL TABLE BEGGO' . BOS
                            MSG
                                      FCC
  006P 24 20 53 59
0073 40 82 8F 8C
  0077 20 38 81 42
0078 86 85 20 28
007P 28 28 28 28
  0083 04
                            STRING
                                      RHD
  00.00
```

O SERON(S) DETECTED

```
004E AP
0050 E6
0054 3A
0055 E6
                                                                                                                                                                                                 S I
                                                                                                                                                                                                              LOWER, D
STARTC, FCR
                                                             7-19-81 TSC ASSERTED
SORT Author: M. Markness. Pleced in Public Dossin. 1981.
                                                                                                                                                                                                                              Point to ker
                                                                                                                                                                    80 0088
90 A8
00
87
87
                                                                                                                                                                                                 LDS
JSR
LDX
CHPA
                                                                                                                                                                                                              RETLEM, PCR
                                                                                                                                                    0059 AD
005C AE
009E 81
                                                                                                                                                                                                              [SCHOTO, PCB]
   9000
                                  MODULE 'SOUT . BLOAD Vers 2.8
                                       308T - GENERAL-PURPOSE SORT ROUTINE
                                                                                                                                                                                                  880
                                                                                                                                                                                             we upper builds pointer down until a key less than equal to Divot key is found.
                                   • Sorts a table of equal length entries of source strings by keys specified by column positions.
                                                                                                                                                    0062 AR
                                                                                                                                                                                                 LBX
                                                                                                                                                                                                              HPPER.B
                                     inputs on U stock:
U+O Eay length
                                                                                                                                                                     42
                                                                                                                                                                                                 TAS
BOA
BOA
                                                                                                                                                                         0064 IT-00P
                                                                                                                                                    0064 1F
0066 E0
0062 82
006C 1F
                                     U-O Eay length
U+1 Stert column
O-2 Record length
U-3 FTF to ead of table (past last element)
U-5 FTF to beginning of table
Gutput: U cleaned up
                                                                                                                                                                                                             I,D
RECLEF, PCR
                                                                                                                                                                     8D 00TC
00
01
                                                                                                                                                                                                  SECA
                                                                                                                                                                                                             D.I
                                                                                                                                                                                     · Compare keye
  0000
                                               EXIT
                                                           SOST
                                                                                                                                                    006E AF
                                                                                                                                                                                                 STA
  0000
                                                                                                                                                                     8D 007 1
                                                                                                                                                                                                  LDS
                                                                                                                                                                                                              S AFTC.PCR
                                                           COPY
                                                                                                                                                    0070 86 8D 0071
0074 3A
0075 86 8D 0068
0079 AD 9C 88
007C 10AE 42
007F 81 86
0081 27 E1
   0002
                                               EXT
                                                           ESCHAS
                                                                                                                                                                                                 LDB
JSR
LDY
                                                                                                                                                                                                             KEYLEN, PCR
[SCOMPR, PCR]
UPPER, U
  0004
                                               EET
                                                          SCOMPS
                        0006 30RT
                                                                                                                                                                                                 CHPA
                                                                                                                                                                                                              #GT
UL DOP
                                  Since U is used by the quicksort routine for pessing parameters to its recursive calls, we seed to asye those values which don't chenge in local storage. This will size leave the U stack in the proper state for the first 'call' to QUECK, which is done by just falling through.
                                                                                                                                                                                                 320
                                                                                                                                                                                    If lower bound is still less than upper bound,
svep the out-of-order pair, and continue
the partitioning process.

    RECLEM needed in rB whether or not the branch
    is taken, since EXCHAN is called in both paths.

 0006 37
0008 47
000C 87
0010 37
0012 47
                                               PULO
                  8D 0000
8D 0005
02
                                               STE
                                                          RETLEM, PCS
STANTC, PCS
                                                                                                                                                   0083 85 8D 905F
0087 4E C4
0089 AC 92
0088 2C 09
008D 10AE 42
                                                                                                                                                                                                 LDE
                                                                                                                                                                                                              PECLEN, PCA
                                                                                                                                                                                                 LOI
                                                                                                                                                                                                              LOWER. D
                                               PULU
                                                          A
RECLET. PCR
                                                                                                                                                                                                 CWX
BOE
LDY
                                                                                                                                                                                                             UPPER, U
RECURS
UPPER, U
                                    Adjust the end pointer to Point to last element
instead of past end of teble. (U points to end pointer)
                                                                                                                                                                    90 FF6E
                                                                                                                                                                                                              [EXCHAN, PCR]
                                                                                                                                                    0090 AD
0098 20
                                                                                                                                                                                                 JSR
                                                                                                                                                                                                 BRA
  0016 EC
                                               2.00
                                                                                                                                                                                    MICORS EDIT
 0018 E0
001C 62
001E ED
                  8D DOCA
                                              SUBS
SECA
                                                          NECLET, PCR
                  00
                                                                                                                                                                                     Move the Pivot element to the middle.
                                                                                                                                                   0096 10AE 44
0099 AD 90 PT65
                                 QUECKNOST ROUTINE
Impute: U+O-uppur partition limit
U+2-lower partition limit
Outpute:0 stack cleaned up
                                                                                                                                                                                     Is order to assure that the etecks will not get
                                                                                                                                                                                    • sacessively deep, the shortest partition must be

• sorted first. If this is done, the stack will not

• get deeper than e=log2(a), where oslist length,

• and e is the length of the stack entry, {log2 of 1Ms20}
                                 • Seserves 5 bytes of temporary storage on V stack
                                 Refer to E&P, 111-116 and
Knuth, vol 3, 114-123
                                                                                                                                                                                                             LOWER, U PTROY, U Length of lower partition LENGTH, KCR PTREED, U LOWER, B Longth of upper partition LENGTH, PCR
                                                                                                                                                                                                 LDD
                                                                                                                                                    0050 BC
                                                                                                                                                   0090 BC C4
009F A3 46
00A1 ED 8D 00A2
00A5 BC 4A
00A7 A3 C4
00A9 10A3 BD 0039
                                                                                                                                                                                                 SUBD
STD
LOO
SUBD
                                                                          Temp storage for lower bound
Temp storage for upper bound
End of partition
Beginning of partition
                                LOVER
                       0000
                      0002
                                                         246
                                                                                                                                                                                                 CHED
                                                                                                                                                                                                 807
808
838
                                              100
                                 PTRECH
                                                                                                                                                   00 AE 2E
                                                                                                                                                                    06
                                                                                                                                                                                                              NOTOG
                                                                                                                                                                         00.80
                                             200
                                                                                                                                                   0080 BD
                      0020 QUICE
                                                                                                                                                                                                             D19
0020 33 5C
                                             LEAU -4.D
                                                                          Reserve temporarles
                                                                                                                                                   00B2 8D
00Ba 20
                                                                                                                                                                                                             QL
OEXII
                                                                                                                                                                    23
                                                                                                                                                                                                 BBA
                                See if we are done with this partition by checking for UPPESCLOWER
                                                                                                                                                                         00B6 DOLON
                                                                                                                                                                                                 EOU
                                                                                                                                                   0086 8D
0088 3D
0084 20
                                                                                                                                                                    15
                                                                                                                                                                                                 ASB.
                                                                                                                                                                                                             QL.
                                                                                                                                                                                                 BSR
                                                                                                                                                                                                             QH
QEXIT
                                             LDY
                                                         PTREND.U
0022 1DAR 44
0025 1DAC 46
0028 102F 0085
                                              CMPY PTRECH. C
                                                                                                                                                                                                 1103
                                                                                                                                                                         ODBC OH
                                                                                                                                                   008C AE C4
0088 86 80
00C2 3A
00C3 10AE 48
                                                                                                                                                                   8D 0054
                                                                                                                                                                                                 LDE
                                                                                                                                                                                                             LOWER, U Lower bound for apper partition RECLER, PCR
                                 Initialize upper and lower pointers
                                                                                                                                                                                                 ABY
005C YE
                                             1.01
                                                         PTD BGB. U
                                                                                                                                                                                                             PTD END . U
                                                                                                                                                                                                 LDY
003E 10AF 42
                                                                                                                                                                                   Call to quick requires upper limit on top of stack,
PSHU X.Y Feeves rX on top, so exchange.
                                                         LOWER . U
                                 * How for the hard part - Partitioning.
                                                                                                                                                   00C6 1E
                                                                                                                                                                                                 223
                                                                                                                                                                    12
                                                                                                                                                   00C8 36
00CA 17
00CD 39
                                                                                                                                                                    10
                                                                                                                                                                                                 PSRU
                                                                                                                                                                                                 LESII
NTS
                                                                                                                                                                    PPS1
                                                                                                                                                                                                             OUICE Sort upper partition
                      0033 PART EQU
                                                                                                                                                                                                 100
                                                                                                                                                                         DOCE GL
                                 * Point PT to key in pivot string
                                                                                                                                                   00CE EC
                                                                                                                                                                    64
                                                                                                                                                                                                 LDO
                                                                                                                                                                                                             LOWER . II
                                                                                                                                                                                                                            Upper bound for lower partition
                                                                                                                                                   00D0 E0 60
00D4 82 00
00D6 1F D1
00D8 10AE 46
                                                                                                                                                                    60 0012
00
01
                                                                                                                                                                                                 SUAD
SUCA
TER
                                                                                                                                                                                                             ENCLEM, PCB
0033 10AE 44
0036 E6 60 00AB
003A 1E 12
003C 3A
003D 1E 12
                                                         PTD EMD. U
                                              LDS
                                                                                                                                                                                                             D.Z
                                              100
                                                         Z.T
                                                                                                                                                                                                 LDY
                                                                                                                                                                                                             PTRBGH. I
                                                                          No ABT available
                                                                                                                                                   00DB 36
00DB 17
                                                                                                                                                                  30
FF 40
                                                                                                                                                                                                 2:810
                                                                                                                                                                                                             I,Y
                                                                                                                                                                                                 LASE
                                              Sort lower partition
                                * Nove lower pointer back a record for the loop, * (Too bad there is no Subtract r8 from Y)
                                                                                                                                                   00 20
                                                                                                                                                                         OOE1 QEXIT
                                                                                                                                                                                                 E) D
                                                                                                                                                   00E1 33
00E3 39
                                                                                                                                                                    48
                                                                                                                                                                                                 LEAU
                                                                                                                                                                                                            8.0
                                                                                                                                                                                                                             Cleek up user stack
                                                         1.0
TECLES, PCD
00
D, I
003F 1F
0041 E0
0045 82
                10
80 0041
00
                                             SUBB
                                             TFR
                                   Nove lower bounds pointer of until a key larger than or equal to pivot bey is found.
                                                                                                                                                                                                                  7-19-81 TSC ASSERBLER PAGE
                                                                                                                                                   SORT 7-19-51 TSC ASS
buthor: ML Narkman, Placed in Public Domnin, 1981.
                                                                                                                                                       00 E4
                                                                                                                                                                                       RETLEM NOB
STARTC RHS
RECLEN NOB
                                11.002
                      0049
                                             201
                                                                                                                                                       0025
0026
0027
                                                                                                                                                                                                    RMB
JOH
JOH
JOHOD
28 9600
               80 0099
                                                         HEG. AL. POR
                                               ARY
 00 ND 34
                                                                                                                                                                                       LENGTH
                                                                                                                                                       0029
                                 ----
```

O EMBOR(S) DETECTED

```
SCHOTS 7-19-51 TBC ASSESSED EX
Author: M. Sarkmass. Placed in Public Domnin, 1981.
                                                                                                                                                                                                                       ITEM
                                                                                                                                                                                                            0000
                                                                                                                                                                                                                                        POU
                                                                                                                                                                                                                                                                          X displacement on U
                                                                                                                                                                                                                        ITEM2
                                                                                                                                                                                                                                        200
                                                                                                                                                                                                            0002
                                                                                                                                                                                                                                        EQU
                                          MEDBULE | SCOMPR - Vere 2.1
                                                                                                                                                                                 0002 36
000% 30
000% AD
                                                                                                                                                                                                      30
8D 0017
9C P5
                                                                                                                                                                                                                                        PSHU
                                                                                                                                                                                                                                                      I, T
TEMPS, PCR
                                           JSR
                                                                                                                                                                                                                                                      [CDPY,PCR] Copy 2nd Itmm to temps
ITEM; U
ITEM2.U
                                                                                                                                                                                 0008 AD 9C
000B 10 AE C4
000E AE 42
0010 AD 9C
0013 31 8D
0017 AE C4
                                                                                                                                                                                                                                        LDY
LDX
JSR
                                                                                                                                                                                                      9C ED
8D 0008
                                                                rE.fr Preserved
rB.fcresh
ras ED for equal,
DI for string I > string Y,
                                                                                                                                                                                                                                                      [COPY.PCB] Copy tat item to 2nd
                                                                                                                                                                                                                                        LEAY
                                                                                                                                                                                                                                                      TEMPS . PCR
                                                                                                                                                                                                                                        LDX
JSR
EQU
                                                                                                                                                                                                                                                      ITEM1,U
[COPT,PCR] Copy temps to lat
                                                                                                                                                                                                     C4
9C E4
                                          Elf for string I caring I as a second in the second in the
                                                                                                                                                                                  0019 AD
                                                                                                                                                                                                            DOIC REIT
                                                                                                                                                                                  001C 37
001E 39
                                                                                                                                                                                                     30
                                                                                                                                                                                                                                       PULU
                                                                                                                                                                                                                                                     X. 7
                                                                                                                                                                                  0015
                                                                                                                                                                                                                       TEMPS
                                                                                                                                                                                                                                       9148 256
ENDMOD
                                           PREV2.1 Corrected tests for LT and GT 15JUL81 HLH
                                                                                                                                                                                                                                                                         Longest permitted string
                                                                                                                                                                                                                                        END
     6060
                                                         DIT
                                                                      SCOKER
                                                                                                                                                                             O ERROR(S) DETECTED
                              0000 SCORPS 80U
                                                                                                                                                                   OSLINE - RLOAD Vers 2.6
Length:0380
                                                          PSHT
EQD
$44,
                                                                        Y,I
     0000 36
                       30
                              0002 COMP
                                                                                                                                                                                 Seginning eddress=0000
                        80
     0002 16
                                                                         . .
     0002 A6
0008 A1
0006 27
0008 2E
000A 86
000C 20
                                                          CMPA
BEQ
BGT
LDA
                                                                                                                                                                    CDD3
                                                                                                                                                                                                                                                      CC2B
                        A0
0A
04
87
                                                                                                                                                                   CD03
FLEX
CD15
GETCHR
CD2D
GETFIL
                                                                                                                                                                                                                                                          1000000
                                                                                                                                                                                                                                                       SYSPCB
                                                                         HGT
                                                                                            BEEY2.1
                                                                                                                                                                                                                                                      DAO3
                                                          BRA
                                                                         EXIT
                              8000
                                         OREV2.1 Rend
                                                                                                                                                                   CD 33
                        86
                                                                       #GT #BGV2.t
                                                                                                                                                                                                                                                      0005
     000E 86
                                                                                                                                                                                                                                                         FMS
                                                                                                                                                                   CD 39
OUTDEC
CD 3C
                                                                                                                                                                                                                                                     0100
STACE
0100
ROPCE
                        00
    0010 20
                                                                        PIIT
                                                         EQU
CMPA
BME
LOA
                              0012 000MT
                                                                                                                                                                       OUTHEX
                                                                        #EOS
CWT1
                                                                                                                                                                   CD24
PCRLF
CD18
PSTREQ
CD18
                                                                                                                                                                                                                                                     0280
     0014 26
                        04
85
                                                                                                                                                                                                                                                      WARCH
ABSPRO - RLOAD Vara 2.0
     0018 20
                        05
                                                           BRA
                                                                         EXIT
                                                          DECE
BACE
LDA
                              COLA CHITI
                                                                                                                                                                                                                                                                  Length=00%
Beginning address=0360
     001A 5A
001B 26
001D 56
                                                                       COMP

#BQ
                                                                                                                                                                       PUTCHE
                                                                                                                                                                   CD3F
RPTERR
                                                                                                                                                                                                                                                          MSPRO
                        85
                                                                                                                                                                                                                                                     COFY - MLOAD Yers 2.0
                             OO IP REIT
                                                          EQU
                                                                                                                                                                  0012AC
                                                                                                                                                                    CCSS
     001F 37
0021 39
                        30
                                                          PULU
RT3
                                                                        Y.X
                                                                                                                                                                                                                                                                   Length-000C
Beginning address@834
                                                                                                                                                                                                                                                     0434
                                                                                                                                                                                                                                                         COPT
     0022
                                                                                                                                                                                                                                                     FAGLORIA Eddress 0446
                                                                                                                                                                   CC24
                                                                                                                                                                   CC26
 O ENDOR(S) DETROTED
                                                                                                                                                                                                                                                     ETTE - BOAD Yers 2.0
                                                                                                                                                                    CCAR
                                                                         7-19-81 TSC #55PHREPR
                                                                                                                                                                        PLADOR
 Author: HL Harkmess. Placed in Public Dogsin, 1981.
                                                                                                                                                                                 Length: 0005
Beginning address:0490
                                                                                                                                                                                                                                                     OPT1
SEARCH
SORT - RLOAD Yers 2.0
                                                                                                                                                                    0442
    0000
                                          MODULE COPY - N.OAD Vere 2.0 *
                                                                                                                                                                    ENTRO
ENCHAM - RLOAD Vare 2.0
Lengthe011P
Beginbing address#0555
                                          Length 00009
Beginning address-0793
                                                                                                                                                                    0557
                                                                                                                                                                                                                                                         SORT
                                                                                                                                                                        EECHAN
                                                                                                                                                                                                                                                      WARNAC - RL AD Vers 2.0
Length=0043
Beginning address=107C
                                                                                                                                                                    EXTPRO - BLOAD Yers 2.0
                                                                                                                                                                                  Lengthe8053
Beginning address=0674
                                             Cutputs- F8-deved
                                                                                                                                                                                                                                                         WREHRC
                                                                                                                                                                       EXTPAO
                                                                                                                                                                                                                                                     ECOPY - RLOAD Vers 2.0
Length=0018
Beginning address=103F
                                                              rB-Aavad
rX-points to byta after end of dest. str.
rY-points after byta last copied from
source string.
                                                                                                                                                                    EXT2 - RLOAD Vers 2.0
Length-00017
                                                                                                                                                                                  Beginning address-06CT
                                                                                                                                                                                                                                                    TOPY
STATE - RL AD Yers 2.0
Length:0002
Desinning address:100A
                                                                                                                                                                       2113
    0000
                                                                    COPY
                                                         EXT
                                                                                                                                                                    GETHAN - MLOAD Vers 2.0
                                                                                                                                                                                 Length=009D
Beginning address=0708
                             OCCC COPY
                                                         EQU
                                                         PSHU
BOU
LDA
    0000 36
                                                                                                                                                                                                                                                        BATHE
                             0002 COPYL
                                                                                                                                                                    DETHAM
FEERS - RLOAD Yers 2.1
                                                                                                                                                                                                                                                     1084
    0002 46
                                                                       . Y.
                                                                                                                                                                                                                                                        STOCK
    000e A7
0006 5A
0007 26
                       80
                                                         STA
                                                                                                                                                                                 length=008C
Beginning address=07AB
                                                         DECB
                                                                                                                                                                                                                                                                *** STOROL TABLE ****
                                                                       COPYL
                                                                                                                                                                                                                                                                                                RPTERR=CD3F
                                                                                                                                                                                                                                                                AB3PR0=0392
                                                                                                                                                                       ATER 25
                                                                                                                                                                                                                                                                                                 SCOMPR=OF4D
SEARCH=OF71
SETEXT=CD33
                             0009 EXIT
                                                                                                                                                                                                                                                               COPY=0434
ENTER=044C
ENTPRO=04A2
ENCHAM=0557
                                                         SOL
                                                                                                                                                                   PASS1 - RLOAD Vere 2.0
    0009 37
                       04
                                                                                                                                                                                 Length=02BE
Beginning address=0837
    000B 39
                                                         RT3
                                                                                                                                                                                                                                                                                                 SORT=OF99
                                                         2HDMOD
                                                                                                                                                                                                                                                                                                 STACK=0100
    0000
                                                                                                                                                                                                                                                               2XT2=06D1
                                                                                                                                                                                                                                                                                                 SYMTAB=10DA
SYMTAB=10DC
SYSFCB=C840
                                                                                                                                                                                                                                                                EXTERO-06 BO
                                                                                                                                                                    PASS2 - RLOAD Vera 2.0
                                                                                                                                                                                                                                                               PILIMPOCC26
PILOUTOCC24
PLADDMOCC18
PLEIOCDO3
                                                                                                                                                                                  Length=023F
Beginnin address=0aP5
D DRIGHT (S) DETRUTED
  BACHAN
   EXCHAM T-19-81 TSC ASSEMBLES
Rulbor: EL Harkmess. Placed in Public Domein, 1981.
                                                                                                                                                                                                                                                                                                  WRFCB=0240
                                                                                                                                                                       PASS2
                                                                                                                                                                                                                                                                                                 ZCOPY = 10BF
                                                                                                                                                                                                                                                               FMS-0406
                                                                                                                                                                   ADBURC - RLOAD Vere 2.0
                                                                                                                                                                                                                                                                PASCE S. DED.
                                                                                                                                                                                 Length=01A5
Regiming address=003%
                                                                                                                                                                                                                                                               OFTCHR.CD15
GETFIL-CD20
OFTPAN-0718
      0000
                                            MODULE 'EXCHAN - RLOAD Vers 2.0 '
                                           • See EXCELE, R&P. This routine exhanges strings
• or pointers, or enything other two items of
• equal lenght up to 256 bytes.
                                                                                                                                                                                                                                                               IMPSWC-CC23
                                                                                                                                                                   MLOAD Vera 2.0
                                                                                                                                                                                                                                                               MEMEND=CC2E
                                                                                                                                                                                 Length = 0062
                                                                                                                                                                                                                                                               NTERPS=07B7
                                                                                                                                                                                Beginning address-GEDF
                                                                                                                                                                   OEF3
                                           * rB-length of item

* rI-pointer to item 1

* rY-pointer to Item 2

* Outputs- rB-saved
                                                                                                                                                                                                                                                               OUTSVC+CC22
                                                                                                                                                                                                             Trenafer addressuCEP3
                                                                                                                                                                                                                                                               P 351+0841
                                                                                                                                                                   SCOMPR - Vera 2.1
                                                                                                                                                                                                                                                                PASS2-0808
                                                                                                                                                                                 Length+6022
Beginning address-OPAD
                                                                                                                                                                  SCOKPA
SEARCH - RLOAD Vere 2.0
                                                                                                                                                                                                                                                               PUTCHE .CD 18
                                                                                                                                                                                                                                                               SCOUNCE OF SA
                                                          EXT COPT
      0000
                                                                                                                                                                                Length-1624
                                                                                                                                                                                 Beginning address+OP6F
```

OS-9 NOTES

From Ray Cadmus 600 W. Lee Moberly, Mo. 65270 (816)263-1228 - Home (816)263-6693 - Office

OS9 NOTES

The topic for the day is communications. No good reason, just that I enjoy communication projects on computers. Perhaps thats a carryover from my years as a ham radio operator experimenting with various types of communications media. Also, since I regularly work with several different types of computers, i'm constantly transferring files from one to another. The subject of computer communications can take in many and varried areas so I'il try to narrow the framework a little. Specifically we'll look at asynchronous, serial, computer to computer communications.

This is the normal mode just like a terminal uses. In fact the simplest way to explore the idea is to look at a simple dumb terminal emulator - then start enhancing it a little bit to make it somewhat more useful. In its simplest form the computer itself becomes nothing more than an expensive terminal. Then we add provision for file to file transfer. The next step is adding some kind of handshaking to insure error free data transfer with automatic retransmission of questionable data. I don't think we'll get into that this time around, but if there is enough interest expressed in that area we can pick it up in more detail at some later data.

On to basics. I'm assuming we have a computer with two serial ports, the control terminal is connected to one. The other port may be connected to another terminel, a modem, or another computer. The results should be Identical. The serial port consists of two addresses which give access to four registers. For sake of discussion we'll consider a serial device at port 0 on an SS50 system. The 2 addresses used would be E000 & E001. If you write to E000 you are writing to the COMMAND register. When you read E000 you are reading the status register, Reading and writing to E001 access the respective data registers. We start out by writing \$03 to the command register to initialize the port. Then we write something like \$15 to the command register to set up proper word length, parity and Interupt availability. Now to read a character comming In we read the status register and test for a character received bit on. If it is we can read the character from the data register. If it isn't, then we go do something else for a while. To write a character out the port we first read the status register and test for output data register empty, if it is empty we can write our character to the data register, otherwise we loop on the status test till It is empty and we can write out our character. By the way, all this assumes that we are using the normal 6850 ACIA in the serial port end that we do not have the I/O interupts turned on. That's a different ballgame.

Now that you understand all this stuff about port addresses, status bytes, bit tests etc. FORGET IT. OS9 handles all that neet stuff for you. All this garbage is handled by one of the serial device drivers normally named ACIA or something like that. As a bonus, the OS9 device drivers ere interupt driven so you dont waste time welting for I/O or dont lose a character because the computer was busy thinking about something else when a character came in.

Now = the simple dumb terminal. You have your terminal connected as the normal controlling terminal and it is using the device descriptor named TERM, Your triend has his terminal connected to the other serial port and it is using the device descriptor called T1. '88' Micro Journal

The Idea is to check the status of TERM and if a character is ready send it to Ti. Then check Ti, if a character is ready, send it to TERM,

In simple form it looks like this:

IF TERM READY

HEN SEND TERM CHAR TO TI.

IF TI READY

HEN SEND TI CHAR TO TERM,

ND LOOP

Now take a look at the listing called CTERM and you'll see the same thing, just dressed up a little. The one problem we run into is the fact that BASICO9 can't check device status, so we use the assembler routine INKEY to handle that. Another consideration is echo of the received or transmitted character. If you are talking with a large computer chances are it will echo everything you send so you see it as input after sending it as output. This is called full duplex. If the device on the other end does not echo everything you're working half-duplex. Our simple terminal emulator assumes full duplex.

The CTERM listing shows the use of the TMODE command from within BASICO9 to turn off the terminal echo and disable some of the control character trapping so we can send things like CTL-C etc. One other consideration is the building of the device descriptor for the output port. We should be able to make a simple assignment to a device, then use tmode to set up that device for no-pause & no-echo but I haven't had much luck with that. What I've done is modify a device descriptor with debug to kill pause and echo, then renamed it to M9 and saved it. In fact it gets loaded as part of the boot group. Perhaps a simpler way to do it would be to modify the TERM device driver source and assemble your own module.

Working from assembler does simplify some of the control functions. Take a look at the listings for CTERM in BASICO9 and for ATERM in assembler. I can't claim that either of these is the definative work in terminel emulation, but they are a start. Now maybe some of the super-coders out there will send us examples of how it SHOULD be done.

**** WARNING ****

I've had an Intermittent problem for about a year with the system hanging. Nothing short of an interupt from another terminal or a reset would shake It loose. This has finally been traced to the ZENITH terminal I was using. A change to a DEC VT 100 pretty much eliminated the problem. This was not just a single bad terminal. I used four or five Z19's over a period of time and had the same problem with them all. I've been In contact with ZENITH but no resolution yet. For now BEWARE THE Z19 with OS9. It generates something that OS9 cannot tolerate. **** MY WANT LIST **** GOOD SCREEN EDITOR MACRO ASSEMBLER DEBUG SYSTEM WITH DIS-ASM & TRACE OPTIMIZING C COMPILER WITH FULL K & FEATURES LOTS OF GOOD APPLICATION SOFTWARE SO WE CAN SELL THESE SYSTEMS

By the way - for those who haven't seen it, "Computerworld" published one of it's benchmark series recently on a Smoke Signal system running OS9. Blow the socks off some prefty impressive hardware systems. Their only negative comment was reguarding the lack of application software availability.

Bye.

```
Microwary 05-9 Assembler 2.1 04/01/82 11:19:02
                                                                                                   ENDLF
                                                                                         0100
  - OS-9 System Symbolic Definitions
                                                                                                   RETURN
                                                                                         0102
                                                                                         0154
              & BASIC INKEY PROC
                                                                                         01C5 30
                                                                                                   REM SPECIAL FUNCTIONS
              1 CALLED BY - RUN INCEYIXI
 00002
                                                                                                    SHELL "THODE ECHO"
                                                                                         01DC
              ACCEPTS A PATH NO
 00003
                                                                                                   IMPUT '(D)ir, (R)eceive, (S)end, (T)erminal, (Q)uit )", ZB
                                                                                         OIFA
              A RETURNS A CHAR DR O
 00004
                                                                                         0270
 00005
                                                                                                   IF IS="T" THEN GOSLID SO \ RETURN
                                                                                         0221
                         TYPE
                                  SET SERTH-OBJET
 60000
         0021
                                                                                         0233
                                                                                                   END1F
         0081
                         REVS
                                  SET
                                        REFNT+1
 00007
                                                                                         0235
                                        /90/DEFS/DS9DEFS
                                  RISE
 80000
                                                                                                   IF Z4="D" THEN
INPUT "DIR NAME >", Z0
                                                                                         0236
 00009
                                                                                         0243
 00010
                                                                                                     CM04-"DIR "+28
                                                                                         0255
             1 DS-9 System Definition File Included
 00011
                                                                                                     SIELL DIDA
                                                                                         0744
 00012
                                                                                                     BOSUB 50
                                                                                         0749
 00013
                                                                                         0260
                                                                                                     RETURN
 00521
                                  opt
                                                                                         024
                                                                                                   FIGIF
        0000 87E0002F
                                  MOD
                                         IKEND, LEMAN, TYPE, REVS. LKENT. O
 00522
                                                                                         0271
        0000 494E4B45
                                  FCS
                                         /INKEY/
                         TRILAN
 00523
                                                                                                   IF IS-'R' THEN
                                                                                         0277
 00524
        0012 KTEA
                         IKENT
                                  LENI 0,5
                                                      SET SP
                                                                                                     PRINT "SORRY - NOT AVAILABLE YET!"
                                                                                         027F
                                                     BET PARM PIR
 00525
        0014 AE44
                                  LDI
                                        4, U
                                                                                                     ADSLIN 50
                                                                                         0298
        0014 A684
                                  LDA
                                        0.1
                                                     PATH NO
 00526
                                                                                         02AL
                                                                                                     RETURN
                                  LDB
                                        01
                                                     GET STAT
 00527
        0018 C601
                                                                                         02A3
                                                                                                   EMBIF
        001A 103F8D
                                  059
                                         112811
 00528
                                                                                         0245
                                                     CHAR READY
                                  338
                                         RECHA
        0018 2405
 00529
                                                                                                    IF ZOS"S" THEM
                                                                                         0744
 00530
        00 EF 8600
                                  1 04
                                         40
                                                                                                      INPUT "ENTER FILE MANE TO TRANSFER )", FIG
                                                                                         02B3
                                                     RETURN O
 00531
        0021 A784
                                  STA
                                        0,1
                                                                                                     OPEN OF FISHREAD
                                                                                         0208
                                                      NO CHAN READY
         0023 39
                         QUIT
                                  RTS
 00532
                                                                                                      WHILE NOTCEDF(OF)) DO
                                                                                         02E 4
        0024 10BE0001
                         ROCHR
                                  LDY
                                                     READ & CHAR
 00533
                                                                                                        GET OF, CO
                                                                                         0755
                                         ISREAD
        0028 103FB9
                                  059
 00534
                                                                                                       PREKT MIGSEN, CO:
                                                                                         02F9
 00535
        0028 39
                                  RTS
                                                                                                      ENDWHILE
                                                                                         0304
 00536
        0020 604098
                                  EMOD
                                                                                                      RETURN
                                                                                         0308
                         IKEND
                                  EOU
                                        1
 00537
        002F
                                                                                         0304
                                                                                                   FM01F
                                                                                         030€
 00000 error (s)
                                                                                         0300
                                                                                                    IF IS-"P" THEN
 00000 warning(s)
                                                                                                      SIELL "THORE ECIO"
                                                                                         031A
 8002F 00067 program bytes generated
                                                                                                     FIND
                                                                                         0328
 801CE 90462 data bytes allocated
                                                                                         032A
                                                                                                   END 1F
 $134E 04942 bytes used for symbols
                                                                                         032C
                                                                                         0323 50
PROCEDURE CTERN
                                                                                                   REM MSB
 0000
          SHELL "LOAD THODE"
                                                                                                    SHELL "THOSE -ECHO"
                                                                                         0339
                                                                                                    PRINT "SEE TERMINAL MODE SEE"
 000E
          REM TERMENAL SIMULATION
                                                                                         0345
           SHELL "THOOE -ECHO"
                                                                                                    RETURN
 0074
                                                                                         0.73
          SHELL "THOOK ABORT=2" \REN ALLOW USE OF CTL-C
0033
 0059
005A
                                                                                        PROCEDURE CTERN
          PRINT "TERNEMAL MODE - USE CONTROL-P TO ENTER SPECIAL FUNCTION MODE"
 005E
                                                                                        SHELL "LOAD THOSE"
 009E
                                                                                         REM TERMINAL SIMULATION
0040
                                                                                        SHEEL "THOSE -ECHO"
          DIN R. M. I. MODEM, TERMR, TERMI: BYTE
0001
                                                                                        SHELL "THODE ABORT=2" \REN ALLOW USE OF CTL-C
          TERMINO LIMBONAL
3800
OOCA
          DEN P.F: INTEGER
 0005
          DIM CO:STRINGCLL
                                                                                        PRINT "TERMINAL MODE - WSE CONTROL-P TO ENTER SPECIAL FUNCTION MODE"
1300
          OPEN 91100EH. "/#9"
                                                                                        PRINT
OGED
COME
          LOOP
                                                                                        DIN R.W.I.MODEN, TERMA, TERMI: BYTE
 00F0
            BOSUB 10
                                                                                        TERMA=0 \TERMA=1
00F4
            BOSUB 20
                                                                                        BLH P, F: INTERER
OOFB
          ENDL.DOP
                                                                                        DIN COISTREMBLES
 OOFC
                                                                                        OPEN MODER, "/119"
OOFB
          REN SICCC READ TERM SESSES
00FE 10
                                                                                        LOOP
0118
          I=TERMR
                                                                                        GOSLIB 10
          RUN JHKEY(I)
0123
                                                                                        60SV8 20
0170
          LF EDO THEN
                                                                                         SOLOUP
            C9=EHR9(1)
0139
             (F CO-CHRO116) THEN
0142
014F
              60SUB 30
                                                                                        10 REM COOCO READ TERM COOLOGO
0153
              RETURN
                                                                                        InTERNA
            FIGNE
0155
                                                                                         RUM CHKEY(I)
            PRINT MODER, CS;
0157
                                                                                         IF IN THEM
0162
          ENDIF
                                                                                        CS-CHRSIII
          RETURN
                                                                                         IF CO-CHRO(16) THEN
0164
                                                                                         BOSLO 30
DIAA
          REM 330000001 READ MODEN 33300030003
0167 20
                                                                                         TO THE
018F
          E-MORFH
                                                                                         ENDIF
                                                                                         PRINT MADEN, CO;
0196
          REM ENKEY(1)
0140
          IF IN THEM
                                                                                         ENDIF
            CO=CHRO(1)
                                                                                         RETURN
DIAC
             PHINT STERM, CO.
0185
```

20 REM SESSASSESS READ MODER SOSSOSSISSE

L≪CENCY

RUN [RICEY(1)

[F EXO THEN

CH-CHRIS]

PRINT DIESON,CO;

EDOIF

SETURD

30 MEM SPECIAL FUNCTIONS
SMELL "IMUME EDMO"
10PMT "(B)ir, (R)occive, (S)end, (T)orninal, (Q)uit)",25

IF 28="1" THEN BOSING SO \ RETURN

IF Z6+"B" THEN IMPUT "DIR MAME >", Z0 CMP0="BIR "+Z6 SMELL CMD6 BOSUB S0 RETURN ENDIF

IF JOSEN THEN
PRINT SORRY - NOT AWAILABLE YET!"
BOSHS 30
RETURN
ENDIF

IF IO-"S" THEN
INPUT "ENTER FILE NAME TO TRANSFER >",FIG
UPED OF,FIG:READ
WHILE NOT(COF(OF)) BO
BET OF,CO
PRINT SHOREN,CO;
ENDAMILE
FINDAMIC
FINDIF

END ENDIF

50 REM MS6 SMELL "TMODE -ECHQ" PRINT "318 TERMINAL MODE 818" RETURN

V-DISK

A Review by E. M. (Bud) Pass, Ph.D.

With the cost of memory dropping, many 6809 FLEX users have reached the 64K byte addressing limit on their 6809 systems. Plugging another 64K board into the system and activating extended memory options on the CPU and memory boards causes FLEX to acknowledge the fact that the system has 112K bytes of memory available but does not provide any convenient means of accessing it.

Many users have converted to UNIFLEX to break the 64K barrier.

Now there is another alternative, named V-DISK, V-DISK is a facility developed by James Arbuckle. When executed, it modifies the FLEX disk driver vectors to cause extended memory beyond the first 64K to be treated as simulated drive number three (by default). This additional "virtual" drive will be regarded by most FLEX commands, utilities, and programs as simply another disk drive. Drive three will appear to have its own directory and free chain and may contain any file types which could be placed on a "real" drive. Only those programs, such as NEWDISK, which deal with the physical aspects of the drive interface hardware, or

have their own disk drivers, may not be used with the "virtual" disk drive. This "virtual" drive differs from a "real" drive in the following areas:

- 1. Speed It is extremely fast,
- 2. Reliability it should never make a hardware error,
- 3. Volatility it loses its contents without power.

The number of sectors allocated to the "virtual" disk depends upon the amount of extended memory available on the system. The user may install as much memory as the system can address. On a standard SWTPC 6809 system, there are four bits of extended memory addresses, which allows sixteen banks of 64K bytes each. However, memory addresses \$EXXX and SFXXX are reserved and mirrored in every bank; so only 896K bytes of addressable memory is available in those systems. Removing the first 56K bytes, 840K bytes of extended memory is available. (With minor modifications to the CPU and I/O addressing to restrict the reserved 8K bytes to \$0EXXX and \$0FXXX, 960K bytes of extended memory would be available). Each sector on the "virtual" disk requires 256 bytes, just as on a "real" disk (under FLEX). During initialization, FLEX checks for the existance of each 4K block of extended memory, by attempting to modify the first two bytes of each 4K block, V-DISK avoids conflicts with FLEX by shipping the first 256 bytes of each 4K block, wasting 1/16 of the available extended address space. This allows "virtual" disk to remain intact, despite the re-booting of FLEX.
If FLEX were modified to restore the changed two bytes in each 4K block of extended memory, V-DISK could easily be modified to use this space.

The first 64K extended memory board provides 203 sectors of "virtual" disk. A single 256K board (192K extended) provides 623 sectors of "virtual" disk, if the amount of exteended memory is less than 501K bytes, the "virtual" disk will be formatted with eight sectors per track; otherwise, it will be formatted with sixteen sectors per track. This is due to the FLEX restriction that track and sector numbers must fit into one byte each.

The V-DISK facility is invoked by executing the program named V-DISK, which may be followed by zero or more optional independent parameters. If "F" is entered, the virtual disk will be reformatted, regardless of its original contents; otherwise, V-DISK attempts to recover the contents of the original "virtual" disk if possible. If a digit from 0 to 3 is entered, the default drive assignment of "virtual" disk to drive three may be overridden. If "*" is entered, the "virtual" disk facility is initialized but is not accessible until VASSIGN is used to assign it a drive number. If "/" and an address is entered, it is assumed to be an ending address for an area of memory to which V-DISK may relocate itself; otherwise, it relocates itself to the end of user memory and resets MEMEND accordingly. V-DISK occupies less than 1K bytes.

 $\mbox{V-DISK}$ is currently delivered in several versions, as follows:

VDISK.CMD uses only the first 56K bytes in each extended memory block, and does not report soft disk errors:

VDISKREP.CMD uses only the first 56K bytes in each extended memory block, but reports soft disk errors:

 $\ensuremath{\text{VDISK}}.\ensuremath{\text{FUL}}$ uses the entire address space, and does not report soft disk errors;

 $\ensuremath{\text{VDISKREP}_{\bullet}}\xspace, FUL uses the entire address space, but reports soft disk errors,$

As useful as V-DISK is, several auxiliary

programs make it even more useful. The simplest is VRESTORE, which nullifies the effect of V-DISK by restoring the FLEX disk driver vectors to their values when V-DISK was called. When using USEMF or other FLEX driver vector modifiers, V-DISK should be called after their invocation, not before, if VRESTORE is to be called later.

Another auxiliary program is VCOPY, which reorganizes and copies FLEX binary files into a special format which permits very fast loading. This special format is, in actuality, a memory-image file which can be loaded sequentially into memory starting at the beginning address. VCOPY will refuse to reformat a program which would overlay itself, V-DISK, or FLEX. Programs may be copied to the "virtual" disk with the standard FLEX utility COPY in case VCOPY will not process them. V-DISK checks for the special format when a program is requested from the "virtual" disk only, it will load standard FLEX - formatted binary files from "real" disk,

VASSIGN is an auxiliary program, similar to ASN, which permits the "virtual" disk number to be determined, modified, assigned, or deassigned, at any point in time after the "virtual" facility has been established, but before it has been disabled by VRESTORE.

The other auxiliary programs are VLOAD and VDUMP. They facilitate high-speed loading and dumping of "virtual" disk to and from "rea!" disk, by copying a memory-image of extended memory to and from "rea!" disk. This copying is performed starting at the end of the "rea!" disk and progressing toward the beginning. The diskette must have enough capacity to contain all of the extended memory address range. The suggested procedure is to take a newly-formatted FLEX diskette, copy a few FLEX files to it (such as FLEX, V-DISK, VLOAD, STARTUP, etc., then LINK it if it is to be bootable), and dedicate the diskette to the use of VDUMP and VLDAD, never writing to the diskette may again except using VDUMP, The diskette may then be used as an offline storage device for backing-up and restoring "virtual" disk at high speed.

What does all this benefit the user? I performed a few timing tests using the TIME function. One of my systems is a SWTPC S-BOX running at 1 MHZ, with one 256K SMS memory board, dual QUME DT-8's connected to a DMAF2 controller and dual MPI B-52's connected to an SMS DDC-16 controller. The following results were obtained:

ASMB - 8" DISK ONLY- ASMB VIRTUAL - ALL VIRTUAL 130 lines 16 12 6 1000 lines 38 34 17

All times are stated in seconds. The results would have shown more pronounced differences if they had been run using the 5" disk. The assembler required about four seconds more to load from "real" disk than from "virtual" disk, it ran about twice as fast from "virtual" disk as from "real" disk. Doubling the speed of the memory and processor would double the speed of "virtual" disk, by definition.

An excellent use of "virtual" disk is for small temporary files, such as short BASIC programs being debugged, and spool files. This can prevent much "real" disk fragmentation due to multiple revisions of files; the primary danger would lie in forgetting to copy the updated file from "virtual" disk to "real" disk.

In the '68 MICRO' rating system, I would rate V-DISK as AA.

V-DiSK may be obtained from the following source:
Southeastern Micro Systems, Inc.,
1080 Irls Drive
Conyers, GA 30207
Teleohone: 404-922-1620
The price is as follows:
V-DISK only - \$99.00
V-DISK plus sources - \$149.00

BIT BUCKET OOPs!!

April 8, 1982

68 MICRO JOURNAL 5900 Cassandra Smith P.O. Box 849 Hison, Tenn 37363

Don Williams,

I was delighted with your publication of my article on disk formeting in the April issue of 58 MECRO JOURNAL. The been waiting for the expected deluge of disks from my offer in the article for a free source. The deluge of most object of the expected deluge of the second of the seco

Leo Taylor 18 Ridge Court West West Haven, Conn. 06516

William Hartmann RR 2 Box 121-1 Blue Springs, MO 64015

April 12, 1982

COMMENTS ON FLEX DISK FORMAT BY LEO TAYLOR April 1982, 68 Micro Journal

In bringing up my system using the general version of flex I found the same things about the speed of FLEX as reported in by Mr. Taylor. One way to speed up the write operation is to use a bit map of the next available sector instead of reading the sector first. The bit map will have a bit set for every free sector.

When a sector is written the bit representing that sector is cleared and when deleting a file a bit will be set for each sector freed. When the last sector is written the bit map has to be stored on the disk, it could be stored in sector 4 and the unused portion of sector 3 (the SIR).

When writting a new sector the next free sector that is closes to the current sector is picked from the map so as to limit head movement, 8y using the bit map scheme the free sectors are always consolidated.

The actual file format written would not change so the read operation would not change, $\,$

In concept this would be an easy modification, However, actually it would require considerable work to find all the places in FLEX to patch, I would like to encourage anyone to try this,

2 Editors Note: We really blew it month before last; we ran a very popular subject article by Leo Taylor, on the formatting of FLEX disk.

WE LEFT LEO'S ADDRESS OUT!! - See what we get when we reproduce from other sources rather than let

our computer do it. Anyway here it is and my apologies: you sure let me know about that with the telephone calls and letters.

Leo Taylor 18 Rldge Court West, Apt 21C Westhaven, Conn. 06516

Sorry bout that Leo and good folks.

PH. 1 (408) 733-6979

Aprtl 5, 1982

OmegaSoft Industrial Products Group P.O. Box 70265 Sunnyvole, CA 94086

Mr. Don Williams 68 Micro Journal P.O. Bom 849 Hixson, TN 37343

In the April 1982 issue of '68' Micro Journal there appeared a raview of Microware's Pascal Compiler that contains some deceiving information (un-intentional I presume). Timings were provided for Ron Anderson's prime number Program for a number of different Pascal Compilers. The Timem for the non-Microware compilers were based on Ron's 1882 mystem, the Helix system is 2882 which makes the Microware compiler's times seem to be much better than the others.

Running on a 2KH2 mystem with a 9600 band CR7 and using the current release (2.0) of OmegaSoft Pascal the following is the latest information ϵ

OmegaSoft Pescal - July 1981 Prime number program : TIME ISEC1 - 30 USER BYTES - 770 TOTAL BYTES - 2790

The times for the other compilers listed in the Vall review should also be adjusted for 28HE operation.

Sincerely yours, Edet Paithe

Robert Reimiller

Vall Electronics. Inc. P.O. Box 1136 Palm Bay, F1. 32905 April 12, 1982

Mr. Don Williams 6B Micro Journal Hisson, Tennessee 37343

Dear Mr. Williams,

Thenk you for printing our letter in the April BIT Bucket. In that letter, we included some timing data that we had compiled using Microware's Fascal, and compared that dats to previously published data on other 5809 Pascal products. It was brought to our attention last week that products. It was prought to our attention last week that the comparison is invalid, because the previously published benchmark tests were reportedly run on a 1 MHz processor, and our tests were run on a 2 MHz processor. The published benchmark timings, to which we compared Microware a Pascal,

did not apacify the Drocessor or terminal speed that was used. So we were not aware of the discrepancy. We also apologize to persona who tried to get in touch with us during the first week of April, when our letter and adventisement first appeared in "68 Micro Journal". An advertisement first appeared in "bd Micro Journal". An (3147 unplanned out of State trip left the phone tended only by an answering machine. We received more calls than the machine (1904) to could handle, so some messages were not recorded. Because of this problem, we will continue to offer the advertised sale Prices on Microware software.

David Vail

Barbar J. Vail David and Barbers Vall Vail Electronics, Inc.

(305) 729-6363 Ronald W. Anderson 3540 Sturbridge Ct. Ann Arbor, MT 48105

MAR. 31, 1982

Dear Don:

Just received by April '68' after talking to you this afternoon. I have one comment to make regarding the letter from Vail Electronics that ends on page 34. They have done a timing comparison of 08-9 Pascal on a 2092 system with my results for

several other Pascals on a 1 MHZ system. Correcting their times a I MHZ system vields:

Pascal	Time (sec)	User Bytes	Total Bytes
08-9 native	54	919	6113
OS-9 pcode	112	427	10241
Lucidata po	ode 15B	578	3929
Cynasoft po	ode 143	301	1490
QuegaSoft n	ative 66	940	2465
TSC native	59	721	14334

That puts things in m little more accurate frame of reference. The times with OS-9 Pascal are still impressive. As we all know, timing comparisons of these compliers on a Prime Number program using only integer arithmetic, only show the relative timing in the integer arithmetic mode. I have run tests using a program with a great deal of REAL arithmetic in which the numbers come out quite differently.

Yours truly.

GIMIX ITIC. 1337 WEST 37th PLACE • CHICAGO, ILLINOIS 60609 • (312) 927-5510 • TWX 910-221-4055

Press Release

GIMIX TO INTRODUCE MULTIUSER 6809 MINCHESTER STETEM AT MCC BOOTH A101

GINIX' \$8998.09. 120RB 6809 system supports up to four terminals features a 2MHz 6809 CPU, 120KB of static RAM, a 19MB (unformatted) 5% Winchester hard disk, a 1MB (unformatted) 5% and four serial 1/0 ports. Remory is espandable up to Additional memory, mass storage capacity, and I/O for additional terminals and peripherals is optional.

The unique ability of the system to select between two operating systems, under software control, makes it an ideal system for software development.

The system price includes OS-9 level 2, a UNIX-like, multi-uner. multi-tanking operating system and the OB-9 Debugger, Text Mitor, and Assembler. Languagea available for OS-9 include BASICO9, PASCAL, CIS COBDL, and C. The system price also includes the GMXSUG/FLEX monitor/operating system combination, a single user (5688) operating system, capable of running any software written for FLAX.

Systems are available from stock to 30 days ARO.

GIMIX versions of OS-9° are sold under ...cense from MECROWARE SYSTEMS CORP. GIMIX versions of PLEX' are sold under license from TECHNICAL SYSTEMS CONSULTANTS.

For further information contact: Richard Don GIMIX Inc. 1337 M. 37th PLACE CHICAGO, 1L 60609 (312) 927-5510



BRITISH COLUMBIA, CANADA, Y2S 1E2

CITMIN'S Sales, Service and Supp

23 March 1982

68 Micro Journal, 5900 Cassandra Smith, Computer Publishing Center, PO 80x 849, Mixson, IN 37363

Following my letter of 15 February last, here's another listing - this time it's CHECKERS - In the series which I promised you. As far as I can tell, its only problem is that when the computer makes a multiple series of lumps it is a little on the slow side in "vanishing" the pieces over which it has jumped, but I have not yes found time to clear this. Haybe someone out there? It's partly my fault as the original version simply made the jumping place appear directly at its destination with all jumped pieces cleared, which made it difficult to see exactly what had happened, so I changed it

to "jump", "clear". "jump", "clear"....., but somehow or other, after the first jump, it seems to slow down a bit. Not that it's too much of a problem, as the orportunity for multiple jumps does not occur very often during a game. One of these days I'll get it sorted out!!

Sincerely



A. Jones

```
10 REM THE GAME OF CHECKERS. AUTHOR UNKNOWN:
11 REM EXPANDED AND HODIFIED TO RUN ON CHIEK 68xx UITH 80x24 VIDEO BOARD
12 RED: BY A. JOHES OF INCRONICS RESEARCH COLP
13 RED: 33363 LYNK AVE. ABBOTSPORO, B.C. CANADA 925 182
                                1) BE: 3338 LYMF AYE. ABBOTSPORO, B.C. CAMADA V2S 182
20 COTO 1000
21 BE: SET CURSOR X-Y CO-ORDINATES
24 PRINT (0.3(27);CHBS11);CHRS(X9);CHRS(27);CHRS(2);CHRS(Y9);
28 BETHER
10 UPSTAIN "WY-RE: LF UKO OR UPF OR VKO OR VPF THEM BETVER:
40 LF SCU,W)=0 THEM GOSUS 100: BETUNB
50 LF SCU,W)=0 THEM RETURN
60 UP-UK-Y, WY-WS: LF UKO OR UPF OR VKO OF VPF THEM BETVER
70 LF SCU,W)=0 THEM O UP 100 OR UPF OR VKO OF VPF THEM BETVER
70 LF SCU,W)=0 THEM O UP 100
                                70 IY S(U,V)=0 THEM O UE 100

800 IETURN
100 IP V=0 ABD S(x,Y)=-1 THEM 0=0+2

110 IF ABS(Y+V)=2 THEM 0=0+5

120 IF Y=7 THEM 0=0+5

120 IF Y=7 THEM 0=0+1

130 IF U=0 OR U=7 THEM 0=0+1

130 IF S(U=C,V=C)<0 THEM 0=0+1:00TO 180

150 O NEXT C:IF Q=E(0)THEM R(0)=0:E(I)=E:R(2)=F:R(3)=U:E(4)=V

190 Q=0:RETURN
200 U=X=A:V=1=1:F U=0 OP U=7 OR V=0 OR V=7 THEM 220

110 IF S(U=C,V)=0 APD S(X=A/1,Y=S/2)>0 THEM 0=0

220 RETURN
220 U=7 S(U,V)=0 APD S(X=A/1,Y=S/2)>0 THEM 0=0

220 RETURN
220 U=PAYT GAUE BOARD
                     1000 PRINTERS(12): TAK(32): GOIDERRS"
1010 PRINTERSHITTERLY PRINTERS
1010 PRINTERSHITTERLY TO THE CONTROL OF TH
1060 PRINT 7,0 is the lower-tight corner"
1070 FRIET?,7 is the upper-tight corner"
1070 FRIET?,7 is the upper-tight corner"
1090 PRIST TRUE Computer virtpo -TO IT you can't jamp eny further.": PRINT
1090 PRIST TRY BOARD ARRAY
1100 DR (4),8(7,7)-0.0-1:8(0)-99
1120 DATA 1.9.1.9.0.9.-1.9.9.1.9.0.9.-1.9.1.1.5
1130 FOR REO TO 7:70C Y0 TO 7: READ J:17 J=15 THEN LISO
1140 S(X,Y)=J:GOTO 1160
1150 RESTOREREAD S(X,Y)
1160 NEXT Y:NEXT X
1170 INFOT Po you want to En first (Y or M) 1AS
1175 PRINT CLRS(12): FOR 1-0 TO 7: PRINT TAB(5=1-3); I;: NEXT I
1185 IF AS=""" OR AS=""" THEN GOSUB JOO: GOTO 1760
1190 KET CLRAR HESSAGE AREA OF DISPLAY
1190 WET CLRAR HESSAGE AREA OF DISPLAY
1200 RE: COMPUTER'S NOVE
1210 PRINT 190 RE: COMPUTER'S NOVE
1210 PRINT 190 ROY IS ...";
1215 YB=6
1220 PRINT 9; GOR Y=0 TO 7: IF S(X,Y)>-1 THEN 1270
1250 IF S(X,Y)=-1 THEN FOR A=-1 TO ISTEP 2: BOG: GOSUB JO:HERT A
1270 BLAY Y: BLAY X
1280 PRINT Y: BLAY X
1290 PRINT Y: PRINT Y: PRINT Y: PRINT Y: PRINT A
1210 PRINT Y: PRINT A=-1 THEN FOR A=-1 TO ISTEP 2: BOG: GOSUB JO:HERT A
1270 BLAY Y: BLAY X
1280 PRINT Y: PRINT X
1290 PRINT Y: PRINT Y: REAT Y: PRINT Y: PRINT X: PRINT X:
       146 IF R(A)=0 TREP S(R(3),R(4))=2 ELSE S(R(3),R(4))=5(R(1),R(2))
1480 COSUB 300
1482 IF ZOI COTO 1980
1484 IF TOI COTO 1980
1484 IF TOI COTO 1990
1485 T=0.7-0.1 IF ABB(R(1)=R(3))<22 COTO 1260
1490 S((R(1)=R(3))/2.(R(2)=R(4))/2)=0
1900 X=R(3).Y=R(4)-1F R(X,Y)=1 THEN B-2:FOR A-2 TO 25TEP4:BOBUS 200
1910 IF R(X,Y)=1 TREW FOR A-1 TO 25TEP4:FOR B-2 TO 19TEP4:COGUR 300:EEXT S
1320 MEMET A: IF R(0)=-99 COTO 1330
1323 X=40:Y=748: CO UR 24
1327 FRIRT "TO":R(3):",";R(4): R(0)=-99: Y8=Y8=1: COTO 1460
1530 COGUR 300
1540 IF ZOI COTO 1980
1550 IF TOI COTO 1980
1550 IF TOI COTO 1980
1550 IF TOI COTO 1990
1540 T=0: Z=0
1750 REMENMAN'S NOVE
1750 LEMENMAN'S NOVE
1750 IF ROUSE 24
1760 INFUT"YOUR NOVE ... from":E,U: X=E: Y=R
1750 T9=T9-1: COSUB 24
1760 INFUT"YOUR NOVE ... from":E,U: X=E: Y=R
1750 T9=T9-1: COSUB 24
1760 INFUT"YOUR NOVE ... from":E,U: X=E: Y=R
1750 T9=T9-1: COSUB 24
1760 INFUT"YOUR NOVE ... from":E,U: X=E: Y=R
1750 T9=T9-1: COSUB 24
1760 INFUT"YOUR NOVE ... from":E,U: X=E: Y=R
1750 T9=T9-1: COSUB 24
1760 INFUT"YOUR NOVE ... from":E,U: X=E: Y=R
1750 T9=T9-1: COSUB 24
1760 INFUT"YOUR NOVE ... from":E,U: X=E: Y=R
1750 T9=T9-1: COSUB 24
1760 INFUT"YOUR NOVE ... from ":E,U: X=E: Y=R
1750 T9=T9-1: COSUB 24
1760 INFUT"YOUR NOVE ... from ":E,U: X=E: Y=R
1750 T9=T9-1: COSUB 24
1760 INFUT:REM TP TO THE TO THE TP TO
          1790 T9-T9-1: COSUS 24
1795 Y-(1-a)/2: IT YC:)WT(Y) TREM POLIT! "Deta's no such equate!": COTO 1770
1800 IF S(X,Y)-O TREM PRINT "There's no piece there to mave!": COTO 1770
1810 IF X(X,Y)-O TREM PRINT "There's not one of your pieces!": COTO 1770
1820 Y9-Y9-1: COSUB 24: INPUTTO ":A,B: X-A: Y-B: Y9-T9-1: COSUB 24
1825 IF S(E,W)-1 AND (B-H)-O TREM PRINT"TOU can't move backwards!": COTO 1840
1830 IF S(X,Y)-O AND ABS(A-E)<-2 AND ABS(A-E)-ABS(B-H) THEN 1850
1835 PRINT"Sorry, you can't do that!"
1840 PRINT CRES(7)1CPES(11)::COTO 1820
```

```
1830 1=66
1850 $(A,8)=$(E,H):$(E,H)=0:1F AB$(E-A)<>1 THEN 1910
1870 $(ECA]/7,(H=B)/2]=0
1870 $(ECA]/7,(H=B)/2]=0
1874 $F = PC COSUE 300
1874 $F = COSUE 300
1875 $(A1,E)$(COSUE 30)
1875 $(A1,E)$(COSUE 30)
1876 $F = COSUE 300
1910 $F = AF THEN $(A,B)=2
1920 COSUE 300
1921 $F = COSUE 300
1921 $F = COSUE 300
1922 $F = COSUE 300
1923 $F = COSUE 300
1923 $F = COSUE 300
1924 $F = COSUE 300
1925 $F = COSUE 300
1925 $F = COSUE 300
1926 $F = COSUE 300
1927 $F = COSUE 300
1928 $F = COSUE 300
1929 $F = COSUE 300
1920 $F = COSUE 300
```

Editor, 68 Micro Journal P.O. Box 849 Hixson, Tennessee 37343

Dear Sir:

Here is a mini-utility for Flex 2.0. It is another version of a "pause on" command. It turns the Flex pause feature on without you having to type, "TTYSET PS=Y". I use it by placing it at the end of a command line which uses the P Command.

Kenneth Drexler
311 Wilson Way
Larkspur, California
94939

```
ESSSEPAUSE DN COMMANDSSES
                                    SDATE: HARCH 11, 1982
                                    SCOMMAND TO ENABLE THE PAUSE FEATURE
BIN FLEX AFTER USE OF THE P COMPAND
SUBJUALLY THE PAUSE ON COMPAND CAN BE
SPLACED IN THE BAME LINE AS THE P
                                    ECOMMAND.
ETHE COPTAND IS CALLED BY "PSON".
10 11 12 13 14 15 16 17 18
                                    SEQUATES
PBFLAG EQUINARMS EQUI
       AC09
                                                                 SACOP
      AD03
                                                                 4AD03
                                                   DRG
BRA
FCB
       A100
                                                                 $A100
PS1
       A100 20 01
A102 02
                                    PBON
                                                                                    VERSION NUMBER
19
20
21
22
      A103 86 FF
A105 B7 AC 09
A108 7E AD 03
                                                    LDA A
BTA A
JMP
                                   P81
                                                                 PSFLAG
                                                                 WARMS
                                                                                    RETURN TO FLEX
                                                    END
                                                                 PSON
```

NO ENWORES DETECTED

STABLE LOSHVE

91 A103 PSFLAG ACOP PSDN A100 VN A102 WARMS AD03



APPLEGATE COMPUTER ENTERPRISES

COMPUTER MAGAZINE INDEX SPECIAL EDITION RELEASED

APPLETATE, ORTEGR--"68* RICAG JOURNAL ?s one of twonty-four makezinza Indoned la the 1780-81 special adition of "The Periodical Culgy For Computer/sta."

The "Commutarist"is extensively cross-referenced, easy to use and lists major articles, product reviews, of testions and miscalleneous times published in 25 commuter and electronics maparines in 1980 and 1981. Ower 19,000 earlies are included in the latest addition of the "Computaries" which retails for \$11.95.

The "Computerizt" index was First oublished in 1976 by Borg Publications of Bothell, Vesbington. ACE, the new publisher, is a sool publishing Fire lacated in arral hoststern Brauen, using a gorthitar electooputer to compile and Sentrate indempublications.

ACT is issuing the double 1980-El edition of the lader so its introductory edition. ACT executs to publish the index couplily and to add to the cuchor of metacines lighted in Juture additions.

Rara information and copies of the 1980-81 "Poriodical Suide for Computerists" at \$11.95 and back issues of the "Computerist" at \$5.00 cosh are collable from Applopate Computer Estarofism, P.O. 8ex 2884, Applopate, OR 37530. Editor 68' MICRO JOURNAL 5900 Cassandra Smith Commuter Publishing Center P.O. Box 849 Hixson, TN. 37343

For those readers who are using the FLEX TEXT PROCESSOR (PR). I am enclosing a macrowhich converts the month number in the system register to the abbreviation of the name. This conversion reduces the inherent ambiguity in dates which use numbers for both days and months.

This macro works by first loading several of the PR user resisters with he menth numbers. As you may note, the sequence of the numbers which are loaded is not critical so long as you can remember where each month's number is located. Next, a conditional test is performed to determine which month's abbreviation to use. This test uses two chained IF statements. There is an implicit AND between the IF statements, i.e. both IF conditions must be satisfied. This construction is necessary because PR does not recognize the logical =. In this macro the negative IF, signified by the ! is used. This form is necessary because it includes the 0 result as an operable outcome. When the tell result is a 0. the title (.TL) associated with that test is Frinted. Complete month names could be substituted for the abbreviations if desired.

The listed macro is actually the header macro for setting up the top of each page. It prints the date at the upper right corner with the page number immediately below it. Then it skips three lines before starting the text.

In my GIMIX 6809 system, this macro is part of the file 1.MACRO.TXT on my working disk, which is read automatically 68 Micro Journal

whenever PR is called. I have included the other macros of this file for reference. This file automatically formats my pages for me. If I did not want it called and read automatically, I could name the file somethins like 1.PAGE.TXT. Then call it at the beginning of the text file being processed, with the command .OF 1.PAGE.TXT, and read it with the command .RI.

With this offering, I would like to encourage other readers to share and clarifications and additions to commercial software which they may have.

Philip Numer Philip Numer 201 Netherfield Comstock Parks MI. 49321

```
.NR B 3
 .NR F 5
 . NR H 6
 . NR J 7
 . NR K 8
 . NR Q 9
 .NR R 10
 .NR 5 11
 .NR T 12
 . NR U 1
 . SP 1
 .IF !#M-#U .IF !#U-#M .TL '''#D-Jan-#Y'
.IF !#M-#A .IF !#A-#M .TL ///#D-Feb-#Y/
IF !#M-#A .IF !#A-#M .TL //*#D-Feb-#Y/
.IF !#M-#B .IF !#B-#M .TL ///#D-May-#Y/
.IF !#M-#E .IF !#E-#M .TL ///#D-May-#Y/
.IF !#M-#F .IF !#F-#M .TL ///#D-Jun-#Y/
.IF !#M-#H .IF !#H-#M .TL ///#D-Jul-#Y/
.IF !#M-#J .IF !#J-#M .TL ///#D-Jul-#Y/
.IF !#M-#K .IF !#K-#M .TL ///#D-Sep-#Y/
.IF !#M-#Q .IF !#Q-#M .TL ///#D-Sep-#Y/
 .IF !#M-#R .IF !#R-#M .TL ///#D-Oct.-#Y/
.IF !#M-#S .IF !#S-#M .TL ///#D-Nov-#Y/
 .IF !#M-#T .IF !#T-#M .TL ///#D-Dec-#Y/
 .TL "" Page ""
 SP 3
 .NS
 . 85
 . DM FT
 .PG
 .AT 1 HD
 .AT -7 FT
 .NL 4
 .LM +6
 .NF>>
```



THE COMPLETE BUSINESS SYSTEM *Multiuser+Highly Expandable+Cost Effective

S+ THE CONCEPT

The S+ system is a modular computer system in which all portions of the hardware and software are designed to work together in the most efficient way possible. An S+ single user system with floppy disk storage is a competitive and cost effective entry level system. Unlike most other small computers being sold as "personal", or "small business" machines, the S+ system may be expanded to maximum capabilities using this same hardware and software. You cannot end up with a DEAD END system that cannot be expanded and whose software is not compatible with larger machines. A basic S+ system may be expanded to thirty-two users, a megabyte of main memory and hundreds of megabytes of hard disk storage by simply plugging in, or connecting the desired upgrade equipment.

TOTAL DESIGN-Hardware and Software

The S+ system is an integrated hardware and software design. The two complement and enhance each other in this system. The UniFLEX® operating system used in the S+ systems is patterned after the Bell Laboratories UNIX® operating system, one of the most admired and widely used operating systems in the world. Instead of being an afterthought, the software is part of the design of the S+ system. You can be sure that with this approach that all parts of the computer operate with maximum efficiency and cost effectiveness.

THE CENTRAL PROCESSOR

The basic S+ system is configured with 256K bytes of memory and can be expanded to more than 1 million bytes. An efficient and fast hardware memory management system is used to allocate the available memory among the users on a dynamic basis. As little as 8K bytes, or the entire memory—if needed—can be used by any individual user. This makes'it possible to run very large programs on the system, but it also uses no more memory than necessary for a particular job. The increase in cost effectiveness of this system over crude and outdated bank switching arrangements is dramatic.

32 '68' Micro Journal

The central processor runs in both user and supervisor states. It can detect and reject a defective user program. It is impossible for a user program to go bad and stop the entire system, as can happen quite easily in less sophisticated systems.

Task switching is accomplished by use of a multiple map RAM memory, with sixty-four individual task maps. Each task can access from 4 to 64 K-bytes of memory. Multiple tasks may be used in programs that require more than 64K bytes of memory for execution. When a task is completed the memory is automatically released for other use.

SOFTWARE

The S+ operating system, UniFLEX® is a multiuser, multitasking operating system based on the UNIX® operating system that has been used for many years on Digital Equipment Corp. PDP-11 series minicomputers. It is considered one of the most sophisticated and "user friendly" operating systems available. Variations of UNIX® are rapidly becoming standard on mini and larger microcomputers.

A large variety of languages are available for use with the system. These include FORTRAN, COBOL, BASIC, and Pascal. Word processing packages are also available to give you full text processing capability on the system.

Applications programs are available in large quantities in many fields. This includes general business, medical, dental, veterinary, library and real estate management; plus others. Since the system is multiuser it can also be connected to cash registers to produce a point-ofsale terminal system combined with the computer. The possibilities for application of this system are endless.

THE I/O SYSTEM

The S+ system is totally interrupt driven. All terminal and printer I/O devices connect to an I/O bus separate from the main bus. Up to thirty-two separate devices may be connected to the I/O bus at any one time. If I/O activity is great enough to cause an unacceptable slowdown in system operation, a separate I/O processor can be installed in the system. This plug-in option removes all I/O handling

overhead from the main processor and allows operation of up to thirty-two external devices at 9,600 baud. Without an integrated total design, as in the S+ system, it would become impractical to use a UNIX®type operating system in a situation with heavy terminal I/O activity.

DISK STORAGE

A wide range of disk storage capacity is available for the S+ system, from 2.5 M-byte floppy disks to an 80 M-byte Winchester and many sizes between. All disk controllers use direct memory access (DMA) type operations to maximize data transfer and to minimize overhead on the main processor. The Winchester disks also use intelligent controllers along with DMA transfers to preserve the performance that these type devices are capable of giving. Without this distributed intelligence the system performance would be greatly degraded. The UniFLEX®operating system is designed to work at maximum efficiency with this type disk system. The data transfer rates achieved by this combination rival those of large minicomputers.

COMMUNICATIONS

A high speed local network communications system is available to interconnect S+ systems. The VIA-BUS® network will allow communication between systems at data rates of over 400K baud. Such a system makes it possible to share data between local systems in an efficient and low-cost manner.

AVAILABLE SOON

Tape backup—20M-Byte in less than 15 minutes on a standard ¼ inch cartridge.

Mini-Wini-5 and 10 M-Byte Winchesters-5% inch package. Winchester performance, for smaller systems in a small package. UniFLEX® compatible design.

Large Capacity—190 and 340 M-Byte Winchesters, plus SMD cartridge drives.

UniFLEX is a registered trademark of Technical Systems Consultants, Inc.

UNIX is a registered trademark of Bell Labs.

VIABUS is a registered trademark of Southwest Technical Products Corporation.



SOUTHWEST TECHNICAL PRODUCTS CORPORATION 219 W. RHAPSODY SAN ANTONIO, TEXAS 78216 (512) 344-0241

SADJE REPORT FRADA RPTERR FRI AD3F DEAR DON, HERE ARE A COUPLE OF PROGRAMS THAT I HAVE FOUND QUITE USEFUL IN WORKING WITH THE FLEX OPERATING SYSTEM, THEY ARE COMPANION PROGRAMS, AND IMPNT CHARACTER FROM TERM LNCH FOU SADO9 DRG \$A100 SHOULD BE PRESENTED TOGETHER I AM ALSO INCLUDING A 4148 DISK WITH EDITOR FILES AND ASSEMBLER FILES FOR BOTH PROGRAMS, IN CASE YOU WOULD LIKE TO REGENERATE THE TEXT FOR PUBLICATION, OR COPY FOR DISTRIBUTION UNDER YOUR "68 MICRO JOURNAL PROGRAMS" SYSTEM, I IP5AV BRA UPSAVI A186 28 6F VERSION NUMBER FCR A102 01 VM 1 ALAT RE GA RNB 2 BEGIN ADA STORAGE BELIEVE THAT THE PROGRAMS ARE PRETTY MUCH SELF END ADA STORAGE ENDA RAB A165 EXPLANATORY. ROGER OUSTERHOUT 511 SEYMOUR ST. DEECET DIE OFFSET VALUE 4167 2 OGDENSBURG, NY 13669 TEMPORARY STORAGE TEMP2 RMR 2 ALGO TEMPORARY STORAGE ALEB TEMP3 RMB 2 МАЛ UPSAVE, CND BLDCK SIZE ALED SIZE RHR 2 RUNADO RMB RUN ADDRESS ALDE DPT PAG POLNE TO FCB **AFCR** ALLI CE AB 40 MPSAVL LDZ & FOR USE NITH A SYSTEM RUNNING FLEX 2.0. JSR GET FILE SPEC ALL4 BD AD 2D GETF 1L A117 25 49 BCS LIPS9 I "MPSAVE" IS A FLET 2.0 PROGRAM TO ALLOW ALIS 86 02 LDA A 02 OPER FOR MRITE CODE E A . BIN OR .CRD FILE TO BE SAVED TO DISK STA A .I A118 A7 68 SET IT E FROM LOW MEMORY, BUT WHICH MAY RUM AT A CLR A SEL , BIN EXTENSION DEFAULT ALID AF # DIFFERENT MEMORY LOCATION. ATTE BD AD 33 JSR SETELL SET EXTENSION # FOR FYAMPLE: THE HISER MYSHT HISE LIVE COM-ALZL BD 84 66 JSR FRS DO OPEN # PANJON PROGRAM "DOWNLOAD" TO LDAD "FLER2. ANE UPS9 ERROR CHECK AL24 26 3C \$ SYS" ENTO REMORY AT \$6700 - \$1FFF; USE ALZ6 CE AB 40 LDX **IFCA** P MONITOR ROBITINGS TO MAKE DESIDED CHANGES. A129 86 FF LDA A #SFF SET FOR BINARY WRITE # THEN USE "UPSAVE" TO RETRISTAL THE CHAMGED SET BOMPRESSION FLAG STA A ASB. I AL28 A7 38 # "FLEIZ.SYS" ONTO BISK. A120 4F CI.R A WRITE METT BYTE CODE SET II A12E A7 88 STA A F.1 # PRDTOCOL FOR "UPSAVE" 15: ANESTRE. JENSER REESET VALUE 44 HETT 2 / A130 CE A2 6C 101 # HPSAVE. (FILE SPEC) PSTRN6 A133 BD AD LE JSR JSR BADDA BET HEX VALUE A136 BD A1 99 # THE PROGRAM WILL PROMPT FOR "DFFSET". A139 24 03 BCC MEE # OFFSET IS THE HEY VALUE TO BE ADDED TO DEFAULT VALUE A138 CE 80 68 LDE . I THE ADDRESS FROM WHICH THE PROGRAM IS A13E FF AI 07 DOFF OFFSET SIL # SAVED TO DETERMINE THE HEX ADDRESS WHERE /ENTER BLOCK BEGIN ADR ? / A141 CE A2 A7 DOBLK 101 **ARFERSE** # THE PROGRAM WILL RUN. TI THIRS A144 BD AD LE JSR **PSTRING** I THE PROGRAM WILL ALSO PROMPT FOR FOR RADDR BUILD ADE IN I AT47 AB AL 99 JCB. I ADDRESS BLOCKS TO BE SAVED. DOTRAM A14A 25 19 # FOR EXAMPLE: IN THE CASE OF UPSAVING FLEIZ. ALAC FF AL 03 SII BEGA # SYS: IF FLEX2 HAS BEEN LOADED WITH "DOWNLOAD" **SENDAGE** JENTER BLOCK END ADR 7 / ALAF CE AZ CB LDX 1 USING THE DEFAULT OFFSET OF 16000. IT WILL HAVE PSTANE A152 80 AD 1E **JSR** # LOADED IN THE AREA OF \$0700-61FFF. WE WOULD JSR BADDR ALSS AD AL 99 # HAVE THEN USED THE SYSTEM MONITOR TO MAKE AMY A158 25 68 RCS DOTRAN I DESTRED CHANGES, AND NOW, WITH "UPSAVE", WHEN A15A FF A1 05 SII ENDA # PROMPTEB FOR "OFFSET", WE WOULD ENTER SAGGO AISD 20 AI FA SAURE F SAVE MIRCE TO DISK 100 : (ABBB+6788=A788). WHEN PROMPTED FOR BEGIN AND RRA DOBLE A160 20 DF I END ADDRESSES, WE WOULD ENTER THE FOLLOWING LOW A162 7E A2 63 UP59 JMP DOERR 1 MEMORY ADDRESSES: 40C06-0C34 (AC60-AC34), 40C49-A165 CE A2 E7 DOTRAN LDX /FMTER TRANSFER ADR 2 / ATRIMISE # OC49 (AC49), SOC4E-OCBO (AC4E-ACBO), SOCCO-OCCO ALAB BD AD IE JSR PSTRMS 1 (RCCO), SOCOB-OCOB (ACDB), SOCE4-OCE4 (ACE4), ALAR 20 A1 99 JSR BADDR # 10CFB-13C2 (ACFB-83C2), 013FD-13FF (83FD-83FF), A16E 25 14 BCS SAVB # \$8488-84EC (AAP8-AAEC), 18848-884F (A848-A84F), ALTO FF AL #3 SII BEGA 1 10700-07FA (A700-A7FA), 11406-1408 (B400-\$408), A173 CE AB 46 SAVIRN LDI POINT TO FCB TRANSFER DELIMETER #FCB 1 \$1435-LEGE (8435-FEGE), \$1E86-JEA2 (8E86-BEA2), LDA A AL76 86 16 6616 E 61E93-1F80 (BEB3-9F90). ON THE MEIT PROMPT FOR A178 83 19 8SR STORE E "BIGIN ADBRESS", ENTER A CARRAIGE RETURN DILY. LDA A BEGA AL7A 86 AL 63 TRANSFER HSBYTE E WHEN PROMPTED FOR "TRANSFER ADDRESS", ENTER BSR STORE A170 80 14 & ADSO. YOU WILL NOW HAVE "SAVEB" FLEX? IN IT'S A17F B6 A1 44 LDA A BEGA+L LSBYTE R DRIGINAL DISK FORMAT WITH YOUR CHANGES INSTALLED. ALB2 80 8F BSR STORE & THE PROGRAM WILL ALSO PROMPT FOR "TRANSFER A184 CE A8 40 SAV8 LDI OFCB CLOSE FILE CLOSE FALE CODE ALR7 84 84 I DA A 44 E ANSWERING ANY PROMPE WITH ONLY A "CR" WILL STA A P.T SET 11 A189 A7 89 E ASSUFE 'NO VALUE". ATOD BD B4 #6 JSR FHS CLOSE FILE UPS9 A18F 26 D2 BNE E WRITTEN BY ROGER OUSTERHOUT, 14 FEB 82. A190 7E AD 03 SIMP MARINS A193 BD 84 66 STORE JSR FR\$ SEND BYTE AMF LIPS9 A196 26 CA A198 39 AIS

A199 8F A1 #8 BADDR

ALPC BD OD

ALAI BD #8

A19E B7 A1 69

A1A3 B7 A1 #A

A1A6 FE A1 89

TEMP3

BYTE

BYTE

TEMP?

STA A TEMP2

STA A 1EMP2+1 LDI

SAVE STACK

READ 2 FRAMES

STS

BSR

BSR

FCB EQU SE1EXT EQU	\$A846 \$AD33		
IPSAVE.CHU			3-23-82 ISC ASSEMBLER
ADZB	GETFIL	EQU	\$AD2D
A343	MARRS	EOU	\$AD03
ABIE	PSTRNG	EDU	SADLE
8406	FMS	EOU	\$8406
B443	FHSCLS	EOU	48463

	0.1 17	CICHAL PORR HEY	AD45 88 84 A4		JSR	FMS	
ALAS DC	RIS	SIGNAL GOOD HEX	AZ4E BD B4 06 AZ51 26 10		BHE	BUERR	
ALAD BD 89 BYTE	OSR INE	GET HET CHAR	A253 FE AL 03		LOI	BEGA	
	ASL A	BC I HE'S CHARL	A2S6 #8		INT	pcon	
ALAD 48 BYTEI ALAE 48	RSL A		A257 FF A1 63		STA	BEGA	
ALAF 48	ASL A		A25A 5A		DEC B		BYTE COUNTER
A188 48	ASL A		A258 27 82		BED	SAVÓ	DO ANOTHER RECORD
A181 16	TAB		A25B 20 E7		BRA	SAV?	
A182 89 62	BSR IMMET						
A184 LB	RBA		A25F 7E A1 E0	SAV6	JHP	SAVBLE	
A185 39	ATS						
ALDS DD AD 89 INNET	JSR INCH	GET CHARACTER	A262 39	BKDOM	RTS		
A109 B1 49	CHP A 416D	15 11 CR ?					
ALBB 27 13	BED MOUN		A263 80 AD 3F	DOERR	JSR	RPTERR	
A180 80 36 [WEI]	SUB A 0138		A266 BD 64 #3		JSR	FMSCLS	
A18F 28 L4	BHI HOTHER		A269 7E AD 03		JAP	WARMS	
AICI BI 09	CMP A 89		A310 AE	GFSTN6	FCC	/ENTED 00	FSE1 VALUE (4 HEI) 7 /
AIC3 25 BA	BLE INTH6		AZB9 #4	Or 3 ino	FCB	4	THE THERE IN THEAT ? I
A1C5 81 11	CMP A 0611		A28A 4E	MHINSG			RE-ENTER (4 HEX) 7 /
ALC7 28 0C	CMP A 001HEY		AZA6 64	MINIO	FCB	4	THE ENTEN TO THE P
AIC9 81 16 AICD 2E 88	BET NOTHEX		A2A7 45	BEGNS6		/ENTER BL	OCK BEGIN ADR (4 HEI) 2 /
AICD 88 67	SHE A 97		A2C7 #4		FCB	4	
ALCE 39 INTHS	RIS		A2CB 45	ENDINSG	FCC	FENTER BL	OCK END ADR (4 HEX) 7 /
			A2E6 04		FCB	4	
ALDO BE AT OR MONLEY	LOS TEMP3	RETRIEVE 6000 STACK	A2E7 45	TRIMS6			CANSFER ADR 14 HEXT 2 /
A183 6D	SEC	SIGNAL NO NUMBER	A384 84		FC0	4	
AID4 39	RTS						
					END	UPSAV	
ALBS CE AZ BA MOTHET		/NOT HEX, REENTER 4 HEX ? /	W0 C00001C1 0C1	CCTCB			
ALDE BO AD IE	JSR PSTRIE		NO ERROR(S) BET	ELIED			
AIDD DE AL OD	BRA DADDR+3				HAH	DOWNLOAD.	CMD
A10E 20 BC	BRA BADDR+3				een	DOMNEO NO.	CUR
ALES BS AL SS SAVSLK	124 A FINDA	COMPUTE BLOCK SIZE			OPT	PAG	
AIE3 F6 AL 66	LBA B ENDA+1	2010 071 02308 0712					
	SUB D DEGA+1			1 120100		C A CLEY S	. # PROGRAM TO ALLOW
AIRS OF AL WO	200 0 00011			. home	roan, 1	2 M LTET 9	TA LYOPING IN METOR
A1E6 FB A1 64 A1E9 B2 A1 63	SEC A BEGA						DE LOADED IN HENORY
		BLOCK SIZE #SBYT		BA .BI	N OR .C	NO FILE TO S OTHER TH	D BE LOADED IN MEMORY WAN 15'S RUNNING LOCATION.
AIET B2 AI #3	SEC A BEGA	BLOCK SIZE #SBYT		# A . BI # AT AN # IT IS	N OR .C ADDRES VALUAB	NO FILE TO S OTHER TH OLE IN ALLO	D BE LOADED IN MEMORY KAN 17'S RUNNING LOCATION. SWING THE OPERAIOR TO
ALEY B2 AL #3 ALEC B7 AL #D ALEF F7 AL #E ALF2 FE AL #D	SDE A BEGA STA A SIZE STA D SIZE+1 LDI SIZE			# A .BI # AT AN # IT 1S # TRANS	N OR .C ADDRES VALUAB FER FRO	NO FILE TO S OTHER TH ILE IN ALLO M DISK TO	D BE LOADED IN MEMORY HAN 13'S RUNNING LOCATION. SHING THE OPERAIOR TO MEMORY A BINARY ENCODED
AIEF B2 AI 63 AIEC B7 AI 60 AIEF F7 AI 6E AIFZ FE AI 6D AIFS 60	SDC A BEGA STA A SIZE STA D SIZE+1 LDZ SIZE INZ	BLOCK SIZE MSBYT ABJUST 1F		# A .BI # AT AN # IT IS # TRANS # FILE	N OR .C ADDRES VALUAB FER FRO FOR EXA	NO FILE TO S OTHER TH DLE IN ALLO M DISK TO MINATION (D BE LOADED IN MEMORY ANN 17'S RUNNING LOCATION. WING THE OPERAIOR TO MEMORY A BINARY ENCODED IR MAKING CHAMMSES TO A
ALEY B2 AL #3 ALEC D7 AL #0 ALEF F7 AL #E ALF2 FE AL #0 ALF5 #0 ALF6 FF AL #0	SDC A BEGA STA A SIZE STA D SIZE+1 LDZ SIZE IMZ STZ SIZE	ABJUST IF		# A .BI # AT AN # IT IS # TRANS # FILE # FILE	N OR .C ADDRES VALUAB FER FRO FOR EXA WHICH 1	ND FILE TO S OTHER TH DLE IN ALLO H DISK TO HINATION O S WRITTEN	D BE LOADED IN MENORY IN 17'S RUNNING LOCATION. IN ING THE OPERAIOR TO MENORY A BINARY ENCODED IR MAKING CHAMMSES TO A TO RUN IN THE COMMAND
AIET B2 AI #3 AIEC B7 AI #0 AIEF F7 AI #E AIFZ FE AI #D AIF5 #6 AIF6 FF AI #0 AIF6 FF AI #0 AIF9 B6 AI #7	SDC A BEGA STA A SIZE STA D SIZE+1 LDZ SIZE INZ	ADJUST IF		# A .BI # AT AM # IT IS # TRANS # FILE # FILE	N OR .C ADDRES VALUAB FER FRO FOR EXA WHICH I AREA, O	MD FILE TO S OTHER TH DLE IN ALLO M DISK TO MINATION O S NRITTEN IR TO TRANS	D BE LOADED IN MEMORY SAN 17'S RUNNING LOCATION. DOUGH THE OPERAIOR TO MEMORY A BINARY ENCODED IR MAKING CHAMMSES TO A TO RUN IN THE COMMAND SFER TO RAN A PROGRAM
ALEY B2 AL #3 ALEC D7 AL #0 ALEF F7 AL #E ALF2 FE AL #0 ALF5 #0 ALF6 FF AL #0	SDC A BEGA STA A SIZE STA B SIZE+1 LDI SIZE INI STI SIZE LDA A OFFSET	ADJUST IF		# A .BI # AT AN # IT IS # TRANS # FILE # FILE # FILE	N OR .C ADDRES VALUAB FER FRO FOR EXA WHICH I AREA, O KED TO	NO FILE TO S OTHER TH ILE IN ALLE M DISK TO MINATION O S WRITTEN IR TO TRANS RUM IN EPF	D BE LOADED IN MEMORY AN 17'S RUNNING LOCATION. DWING THE OPERAIOR TO MEMORY A BINARY ENCODED IN MAKING CHAMBES TO A TO RUN IN THE COMMAND SFER TO RAN A PROGRAM ROM (ALLOMS USER TO USE
AIET B2 AI #3 AIEC B7 AI #0 AIEF F7 AI #E AIF2 FE AI #0 AIF5 #6 AIF6 FF AI #0 AIF9 B6 AI #7 AIFC F6 AI #8	SDC A BEGA STA A SIZE STA D SIZE+1 LDI SIZE INI STI SIZE LDA A OFFSET LDA B OFFSET+1	ADJUST IF		# A .BI # AT AN # IT IS # TRANS # FILE # FILE # FILE	N OR .C ADDRES VALUAB FER FRO FOR EXA WHICH I AREA, O KED TO	NO FILE TO S OTHER TH ILE IN ALLE M DISK TO MINATION O S WRITTEN IR TO TRANS RUM IN EPF	D BE LOADED IN MEMORY SAN 17'S RUNNING LOCATION. DOUGH THE OPERAIOR TO MEMORY A BINARY ENCODED IR MAKING CHAMMSES TO A TO RUN IN THE COMMAND SFER TO RAN A PROGRAM
AIEF B2 AI 63 AIEC B7 AI 60 AIEF F7 AI 6E AIF2 FE AI 60 AIF5 66 AIF6 FF AI 60 AIF6 FF AI 60 AIF6 F6 AI 60 AIF6 F6 AI 60 AIFF F6 AI 60	SDC A BEGA STA A SIZE STA B SIZE+1 LDI SIZE INI STI SIZE LDA A OFFSET LDA B OFFSET+1 ADD B BEGA+1	ADJUST IF		# A .BI # AT AM # IT IS # TRAMS # FILE # FILE # DESTI # EXIST	N OR .C ADDRES VALUAB FER FRO FOR EXA WHICH I AREA, O KED TO ING EPR	NO FILE TO S OTHER TH DLE IM ALLO M DISK TO MINATION O S WRITTEN IR TO TRANS RUM IN EPF OM BURNER	D BE LOADED IN MEMORY AN 17'S RUNNING LOCATION. DWING THE OPERAIOR TO MEMORY A BINARY ENCODED IN MAKING CHAMBES TO A TO RUN IN THE COMMAND SFER TO RAN A PROGRAM ROM (ALLOMS USER TO USE
AIEF B2 AI 63 AIEC B7 AI 6D AIEF F7 AI 6E AIF2 FE AI 6D AIF5 66 AIF6 FF AI 6D AIF9 B6 AI 67 AIFC F6 AI 60 AIFF F0 AI 64 A202 89 AI 63	SDC A BEGA STA A SIZE STA D SIZE+1 LDI SIZE IMI STI SIZE LDA A OFFSET LDA B OFFSET+1 ADD D BEGA+1 ADC A BEGA STA A RUMADD STA D RUMADD+1	ABJUST 1F COMPLITE RUM ADR RUM ADR STORAGE		# A .BI # AT AM # IT 1S # TRAMS # FILE # FILE # FILE # DESTI # EXIST	K OR .C ADDRES VALUAB FER FRO FOR EXA WHICH 1 AREA, O MED TO ING EPR	NO FILE TO S OTHER TH DLE IM ALLO M DISK TO MINATION O S WRITTEN IR TO TRANS RUM IN EPF OM BURNER	D BE LOADED IN MEMORY AN 17'S RUNNING LOCATION. WING THE OPERAIOR TO MEMORY A BIMARY ENCODED IR MAKING CHAMBES TO A TO RUN IN THE COMMAND SFER TO RAN A PROGRAM ROM (ALLOMS USER TO USE PROGRAMSI. WHICH PERFORMS THE
AIEF B2 AI 63 AIEC B7 AI 60 AIEF F7 AI 6E AIF2 FE AI 6D AIF5 06 AIF6 FF AI 6D AIF9 B6 AI 67 AIFC F6 AI 60 AIFF F0 AI 64 A202 89 AI 63 A205 B7 AI 0F	SDC A BEGA STA A SIZE STA D SIZE+1 LDI SIZE IMI STI SIZE LDA A OFFSET LDA B OFFSET+1 ADD D BEGA+1 ADC A BEGA STA A RUMADD STA D RUMADD+1 LDA A SIZE	ABJUST 1F COMPLETE RUM ADR RUM ADR STORAGE		# A .BI # AT AM # IT 1S # TRAMS # FILE # FILE # FILE # DESTI # EXIST	K OR .C ADDRES VALUAB FER FRO FOR EXA WHICH 1 AREA, O MED TO ING EPR	NO FILE TO S OTHER TH ILE IN ALLE M DISK TO MINATION O S WRITTEN IR TO TRANS RUM IN EPP IGM BURNER IM PROGRAM	D BE LOADED IN MEMORY AN 17'S RUNNING LOCATION. WING THE OPERAIOR TO MEMORY A BIMARY ENCODED IR MAKING CHAMBES TO A TO RUN IN THE COMMAND SFER TO RAN A PROGRAM ROM (ALLOMS USER TO USE PROGRAMSI. WHICH PERFORMS THE
AIEF B2 AI #3 AIEC B7 AI #0 AIEF F7 AI #E AIFF FF AI #B AIF5 #6 AIF6 FF AI #B AIF6 FF AI #B AIF7 B6 AI #7 AIFC F6 AI #8 AIFF FB AI #6 A202 89 AI #3 A205 B7 AI #6 A200 86 AI #0 DOREC A20E F6 AI #E	SDC A BEGA STA A SIZE STA B SIZE+1 LDX SIZE INI STX SIZE LDA A OFFSET+1 ADD B BEGA+1 ADC A BEGA STA A RUMADD STA B RUMADD+1 LDA A SIZE LDA B SIZE+1	ADJUST 1F COMPUTE RUM ADR RUM ADR STORAGE DETERMINE RECORD SIZE		¢ A .BI a AT AM lt is lt trans file file file c desti e exist the c oppos l proto l proto l proto l proto l proto	N OR .C ADDRES VALUAB FER FRO FOR EXA WHICH 1 AREA, O WED TO 1NG EPR OMPANIE SITE FUN CAGL FO	IND FILE TO S OTHER TH DLE IM ALLO M BISK TO MINATION O S WRITTEN IN TO TRAIN RUM IN EPH OM BURNER IN PROGRAM ICTION 1 °1 IR °DUNNLO	D BE LOADED IN MEMORY AN 17'S RUNNING LOCATION. WING THE OPERAIOR TO MEMORY A BIMARY ENCODED IR MAKING CHAMBES TO A TO RUN IN THE COMMAND SFER TO RAM A PROGRAM ROM (ALLOWS USER TO USE PROGRAMS). WHICH PERFORMS THE UPSAVE".
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AIEF B2 AI 63 AIEC B7 AI 6D AIEF F7 AI 6E AIF2 FE AI 6D AIF5 FF AI 6D AIF6 FF AI 6D AIF6 FF AI 6B AIF7 B6 AI 67 AIFC F6 AI 6B AIFF F8 AI 64 A202 B9 AI 03 A205 B7 AI 9F A208 F7 AI 9B A208 F6 AI 6D A208 F6 AI 6D A208 F6 AI 6D A208 F6 AI 6D A208 F6 AI 6E A211 C6 C4 A213 B2 60	SDC A BEGA STA A SIZE STA B SIZE+1 LDI SIZE INI STI SIZE LDA A OFFSET+1 ADD B BEGA+1 ADC A BEGA STA A RUMADD STA B RUMADD+1 LDA A SIZE+1 SUB B 00C4 SBC A 00	ADJUST 1F COMPUTE RUM ADR RUM ADR STORAGE DETERMINE RECORD SIZE		& A .BI 3 AT AN 1 IT 1S 1 TRAMS 3 FILE 4 FILE 6 DEST1 6 EXIST J THE C 6 OPPOS 6 PROTO 1 DOMM 6	N OR .C ADDRES VALUAB FER FRO FOR EXA WHICH I AREA, O KED TO ING EPR ONPANIE SITE FUN CAGE, FO NLOAD, FE	IND FILE TO S OTHER TO ILE IM ALLO M DISK TO MINATION O S WRITTEN IR TO TRAM RUM IN EPP GM BURNER IN PROGRAM ICTION 1 "1 IR "DOWNLOW ILE SPEC>	D BE LOADED IN MEMORY AN 17'S RUNNING LOCATION. WING THE OPERATOR TO MEMORY A BINARY ENCODED IN MAKING CHAMBES TO A TO RUN IN THE COMMAND SEER TO RAM A PROGRAM ROM (ALLONS USER TO USE PROGRAMSI. WHICH PERFORMS THE IMPSAVE". AD" IS: L, MEY VALUE I
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AIEF B2 AI 63 AIEC B7 AI 6D AIEF F7 AI 6E AIF2 FE AI 6D AIF5 00 AIF6 FF AI 6D AIF7 B6 AI 67 AIFC F6 AI 60 AIFF FD AI 64 A202 B9 AI 83 A205 B7 AI 9F A208 F7 AI 10 A200 B6 AI 60 DUREC A211 C6 C4 A213 B2 00 A213 B2 00 A217 B7 AI 8E	SDC A BEGA STA A SIZE STA D SIZE+1 LDI SIZE INI STI SIZE LDA A OFFSET+1 ADD D BEGA+1 ADC A BEGA STA A RUMADD STA D RUMADD+1 LDA A SIZE LDA B SIZE+1 SUB B 0+C4 SBC A 0+0 GCS TOBIG STA A SIZE STA B SIZE+1	ADJUST 1F COMPUTE RUM ADR RUM ADR STORAGE DETERMINE RECORD SIZE		& A .BI 3 AT AM 4 IT IS I TRAMS 3 FILE 6 FILE 6 DESTI 6 EXIST J THE C 6 OPPOS 6 PROTO 7 DOMM 6 7 "HE I 7 THE V 8 ADDRE 6 LGAD	K OR . C ADDRES VALUAB FER FRO FOR EXA WHICH I AREA, O MED TO I MG EPR ONPANIO CAGE. FO NLOAD, FF VALUE TO SS OF T ADDRESS	IND FILE TO S OTHER TO SLE IM ALLO M DISK TO MINATION O S WRITTEN IR TO TRAIN RUM IN EPI GM BURNER W PROGRAM ICTION 1 "1 IR "DOWNLOW TILE SPECY! IS OPIION O BE ADDEO INE FILE TO S. DEFAML'	D BE LOADED IN MEMORY SAN 17'S RUNNING LOCATION. DAING THE OPERAIOR TO MEMORY A BIMARY ENCODED IR MAKING CHAMBES TO A TO RUN IN THE COMMAND SFER TO RAM A PROGRAM ROM (ALLOMS USER TO USE PROGRAMSI. WHICH PERFORMS THE IPSAVE". AD" IS: I, HEY VALUE I AL. AND DETERMINES TO THE MORNAL LOAD D DETERMINE THE NEW
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AIEF B2 AI 63 AIEC B7 AI 6D AIEF F7 AI 6E AIF2 FE AI 6D AIF5 FF AI 6D AIF6 FF AI 6D AIF6 FF AI 6B AIF7 B6 AI 67 AIFC F6 AI 6B AIFF FB AI 64 A202 B9 AI 03 A205 B7 AI 6F A208 F7 AI 6B A201 C6 C4 A213 B2 60 A217 B7 AI 6D A216 F7 AI 6B A217 B7 AI 6B A217 B7 AI 6B A217 B7 AI 6B A218 F7 AI 6B A219 C6 C4 A217 C7 C6 C4 A217 C7	SDC A BEGA STA A SIZE STA B SIZE+1 LDI SIZE INI SIZE LDA A OFFSET+1 ADD B BEGA+1 ADC A BEGA STA A RUMADD+1 LDA A SIZE LDA B SIZE+1 SUB B 00C4 SBC A 00 BCS TODIG STA A SIZE LDA B SIZE+1 LDA B SIZE+1 LDA B SIZE+1 SUB B 00C4 SBC A 00 BCS STA A SIZE LDA B SIZE+1 BCD B SIZE+1 BCD BKDOM	ABJUST 1F COMPUTE RUM ADR RUM ADR STORAGE DETERMINE RECORD SIZE SEE 1F %C4 TOO BIG		& A .BI 3 AT AM 4 IT IS I TRANS I FILE 6 FILE 6 DESTI 6 EXIST J THE C 6 OPPOS 6 PROTO 7 DOMM 6 7 THE V 8 ADDRE 6 LOADS 6 SO TH 7 LOADS	N OR . C ADDRES VALUAB FER FRO FOR EXA INHICH J AREA, O KED TO ING EPR ONPANIO CAGL FO NLOAD, FO VALUE TO SS OF T ADDRES INT A . C S AT 9 AT	IND FILE TO S OTHER THE LE IM ALLE M DISK TO MINATION O S MRITTEN OR TO TRAIN RUM IN EPF OM BURNER IN PROGRAM (CTION 1 °1) IR "DOWNLOW FILE SPEC) IS OPTION O BE ADDEO (THE FILE IN LIM, FOR E	D BE LOADED IN MEMORY SAN 17'S RUNNING LOCATION. DOING THE OPERAIOR TO MEMORY A BINARY ENCODED R MAKING CHANGES TO A TO RUN IN THE COMMAND SFER TO RAM A PROGRAM ROM (ALLOMS USER TO USE PROGRAMSI. WHICH PERFORMS THE MALCH STREET AD" 15: L, HEY VALUE 1 MAL, AND DETERMINES TO THE MORNAL LOAD D DETERMINE THE NEW T VALUE IS \$6000, HICH MORNALLY
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A198 86 41		LDA A	81	OPEN FOR READ CODE
ALSD A7 66		STA A	0,1	SET 11
AISF 4F		CLR A		SEL . BIN EXT DEFAULT
A114 80 AD 33		JSR	SETETT	SET EXTENSION
A113 86 AC 11		LOA A	LASTRA	GET LAST TERMINATOR
A116 81 2C		EMP A	1520	15 IT COMMA ?
A118 27 8F		950	DWN1	
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A11C 27 #8		938	DAN 1	
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A120 27 11		938	DNN2	
A122 B1 #D		CMP A	458D	
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A126 7E A1 59		JMP	SYNERR	
A129 BD AD 42		JSR	BETHET	GET HET ADDRESS
A12E 25 33		BCS	NUMERR	
ALZE FF AC 18	DIM 4	STI	LDOFST	SET LOAD OFFSET VALUE
A131 20 05		BRA	DMM3	
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A13E 26 10		BNE	DWN9	
A146 86 FF		LDA A	OSFF	SET FOR BINARY READ
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A144 BD AD 38		JSA	LOAD	LOAD THE FILE
A147 CE 60 60		LDI	11	
A14A FF AC 18		STE	LDOFST	CLEAR OFFSET VALUE
A140 7E AD 83		JMP	WARKS	
A150 BD AD 3F	DIMY		RPTERR	REPORT ERROR
A153 BD 84 83	DWM5	JSR	FHSCLS	CLOSE ALL FILES
A156 7E AD #3		JIP	WARES	
ALSO CE AL 69	SYNERR	LDI	#SYNRS6	/SYNTAX ERROR, REENTER COMMAND/
ASSC BD AD LE		JSR	PSTRNS	
A15F 20 F2		BRA	DWKS	
A161 CE A1 87	MUNERR	LDX	ONUMITS6	/HEX NUMBER ERROR, REENTER COMMAND/
AL64 BD AD EE		JSR	PSTRNG	
A167 28 EA		BRA	DIMS	
AL69 53	SYN#S6		/SYNTAX E	RRDR, REENTER COMMAND/
ALB6 84		FCB	4	
A187 48	NUMMS6			BER ERROR, REENTER COMMAND/
ALAS #4		FCB	4	
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Electronic Specialists, Inc. 171 South Main Street, Natick, Mass. 01760 (817) 855-1537

HEN PRODUCT RELEASE

FOR INSEDIATE RELEASE

FOR MORE INFORMATION: FRANK STIFTER

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Spike/Surge Suppressor is designed into each unit.

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NEWSRELEASE

FOR IMPEDIATE RELEASE

COMPARATIVE STUDY AND REPORT ON THE CHIEFTAIN SERIES AVAILABLE FROM THE MANUFACTURER

MESTLAME VILLAGE, CA...SMOKE STOWAL. manufacturer of the CHIEFTAIN first Series of business Computers based on the 16 bit 6809 processor, has announced the availability of a report based on a series of benchmarks that were performed on the manufacturer's computer systems by the Association of Computer Users and the Business Research Division of the University of Colorado.

The Association of Computer Users is a world-wide, non-profit organization, whose many facets include a monthly magazine as well as responsibility for the unbiased Benchmark Reports and associated articles in major trade publications. The Association of Computer Users, in collaboration with the University of Colorado, perform three separate series of benchmark tests on computers which are divided into price categories. Smoke Signal's CHIEFTAIN was tested in the Under-525,000 category.

In a new evaluation from ACO and the University of Colorado, Susiness Research Division, the Smoke Signal CHIEFTAIN was found to be "one of the fastest tested in this series." The CHIEFTAIN was also one of the only systems lested with multi-user, multi-tasking capability in this price range, and with features comparable to those of sdvanced systems.

The Benchmark Report also discusses the reaction of endusers. According to ACU. "Users remarked that the 'OS-9 Operating System and BASICO9 High-Level Language were excellent'." Another user went on to say, "I bought it (CHISFTAIN) because it was obvious that it was the best around. The best feature is the reliability, it just sits there and works!"

Ric Hammond, President of Smoke Signal, said, "We felt that ACU and the University of Colorado ware very thorough in their analysis of the CHIEFTAIN, we were exceptionally pleased with the results of the tests and the overall reactions of the unbiased and independent parties involved in the evaluation—capecially the end-users."

The Benchmark Report on the system covered five main teating categories: CPU and 1/O intensive for speed; a Scientific and Engineering Test which exercises compute times and speed; A New Product Planning Problem application; an Accounts Receivable generation application; and an 'Xese of Use' Test.

All of these tests are implemented the same regardless of the manufacturer and the differences between the computer systems within that particular range; in this case, the Under \$25,000 Category. The results of the tests are described in the 24-page report written by ACO and the University of Colorado.

Smoke Signal's CHIEFTAIN 9822 (double-side, doubledensity 8-inch Rioppy based systaml and the CHIEFTAIN 99N10 (a 10 Megabyte 6-inch Winchester and an 8-inch double aide, double density floppy or 20 Megabyte Tape Streamer) were tested running the new UNIX comparable multi-user, multitasking, operating system, OS-9. BASICO9, the incremental compiler BASIC for the 08-9 operating system was also tested.

The CHIEFTAIN Series Benchmark Report also includes detailed descriptions of the hardware components, the software commonents, the support components, and the pricing of each evetem. A highlight of the report is the interviews with users of the systems that: ACU and the University conducted, and comments by the users are contained throughout the entire report. Also included are comments from ACU and the Business Research Division of the University of Colorado: what they thought of the CHIEFTAIN, and an extensive analysis of their overall observations of the performance and impraction of the CHITPTAIN Series.

The CHIEFTAIN Series of computers range from 5 1/4-inch floppies, to 8-inch floopies, to 5 1/4-inch Winchesters, to 8-inch winchesters. The CHIEFTAIN Winchester based systems range from 4 to 70 Megabyte configurations. A 20 Megabyte 1/4-inch tape atreamer for backing up the larger atorage hard disk computers is eveilable size. RAM capacity for the standard CHIEFTAIN is 64K (and upgradeable to 1 Matabyte RAM), all evateme come standard with Smoke Signal's own einSle-user operating avates -00869D - and two serial I/O ports.

For a copy of the Association of Computer Users BENCHMARK REPORT on SMOKE SIGNAL'S CHIEFTAIN Series of Business Computers, please write or call Smoke Signal directly.

Smoke Signal will be exhibiting the CHIEFTAIN Series at MCC '82 booths 42922-2923, June 7-10, 1982, at the Astrodorens in Houston, Texas.

PLEASE CONTACT:

Dehorah Conrad, Manager, Dealer Sales and Support Jim Alldey, National Sales Manager



SMOKE SIGNAL 12236 Via Colinas, Westlake Village, CA 91361 . Tet (712) 889-1940

Smoke Signal Chieffains Set New Standards For Speed and Cost-Effectiveness

	C-3 hecounts Receivable Time	Current Price
CHIEFTAIN 9822	1:40.7	\$ 8,149
CHIEFTAIN 98W10		12,149
PERTEC PC 2000		12,470
NORTH STAR HORIZON		6.911
CROMEMCO SYSTEM TWO		9,275
TEXAS INSTRUMENTS MODEL 771	3 38 1	12,100
VECTOR GRAPHIC SYSTEM B	5 56.5	0.995
DECSTATION 78		10.495
RADIO SHACK TRS-80 MODEL II		7,509
APPLE II+		4.330
DIGITAL MICROSYSTEMS DSC-2		9.015
OHIO SCIENTIFIC C3-A		10.940
ALPHA MICRO AM-1011		15.605
DATA GENERAL CS/10		13.400
ALTOS A CS6000-15	10:41.5	9,875
DYNABYTE SOOD		8.535
IBM 5120	4:18.2	13,705

"Time of 2:40.3 was obtained using hard disk system.

Prices are liet prices of configurations lested including CAT and Printer

'68' Micro Journal 5900 Cassandra Smith Rd. Hixaon, TN 37343

Dear Mr. Williams:

First off, I want to say how pleased I am to hear from several readers in response to my last letter; and to thank again those who took the time to show interest and to share some of what they're doing.

Here is a routine called "GETNUM" that functions similarly to FLEX's "GETHEX" routine except that this one can be used to input numbers in binary, octal, decimal, hexidecimal, or any base from 2 to 16 (try out base 5 or maybe 11(). In fact, it is not limited to this range, but more characters would have to be added (G,H,etc.) for bases beyond 16. This program uses the stack for a work area and also demonstrates how handy is the hardware multiply of the 6809. Don't look at the address of NATCH in the listing as this is it's address in my own system. Any other questions should be shawered in the listing.

Sincerely.

Rong J. Kron

No.24 Late English

Kalons, Iowa 52247

MODUS RESIDENT ASSEMBLES VI.O 05/05/11 01:19:45 PM

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Merch 22,1982

68 Micro Journel 5900 Cessendrs Smith Computer Publishing Center P.O. Box 649 Mixton, IN. 37343

Enclosed is a small program which operates as a Utility for the 6800 FLEX 2 005. The Utility was written as an aid to making EPROM's for Monitor use. Using the stendard fLEX Syntax: BIMOVE. «file spec», the Utility will prompt you with the question. "MOVE BINARY FIGE TO?". Supply the desired MEX address. [XXXXX] and the file will be placed enywhere in memory.

This program token care of the problem of the first four bytem in the FLEX 2, 256 byte diek sector which is disk related information. If this program is to be used with MINI-FLEX a different type of counter would be needed for the \$28 byte sector.

Yours truly,

Milliam H. Hell 6232 Monderest Ln. Delles, 1X. 75214

* BIMOVE *
* BIMARY FILE MOVE UTILITY

STACK OOS WARM START ENTRY
INPUT CHAR ROUTINE
OUTPUT CHAR ROUTINE
GET FILE SPECIFICATIONS
PRINT OATA STRING
PRINT CAT A LF
SET DEFAULT NAME EXT,
REPORT DISK ERROR A003 A015 A016 A020 AD1E A024 1A003 3A015 SA016 SA020 FA01E BA024 EDU WARMS EDU
GETCHR EQU
PUT DIR EQU
GETFIL EQU
PSTRING EDU
PCRLF EQU
SETEXT EOU
RPTERR EDU AD33 \$A033 AO3F SADSE

. FMS EQUATES .

FMS EQU FMSCLS EQU

. SYSTEM EQUATES .

AB40 F CS EQU \$ AB 40 SYSTEM FCB

. GET MENDRY BASE ADDRESS .

ORG SAIBO A100 20 01 A102 01 BRA CO VERSION 1
GET MESSAGE
OUTPUT MESSAGE
GET ADDRESS
SLORE BASE ADDRESS
PRINT ER B LF NOP LOX JSR JSR SIX A102 01 A103 CE A1 A106 80 A0 A109 80 A1 A10C FF A1 A10F 80 A0 A112 20 00 PSTRING INPUT XTEMP1 1E 9F 08 24 PCRLF LIST1 OPEN FILE

. GPEN OL K FILE .

A114 CE AB 40 A117 BO AD 20 A11A 25 63 A11C 86 01 A11E A7 00 A120 86 00 A120 80 AD 33 A125 80 84 06 A126 26 55 A12A 86 FF A12C A7 3B A12E 86 00 A130 87 A1 E0 POINT TO FCO GET FILE SPEC ANY ERRORS? SET UP COSE OPEN FOR READ SET UP BINA Y SET BIN EXTENSION CALL FRS CHECK FOR ERRORS SET FF FOR BINARY SUPPRESSION FLAG FCB GETFIL LIST9 F1 U.X LOX JSR BCS LOA LISTI LOA A STA A LOA A STA A
LBA A
JSR
JSR
BNE
LOA A
STA A
LDA A
STA A ## 100 SETEX1 FMS LIS19 ## 15F 59. X ## 100 SETEX1 SET UP BYTE COUNTER

. BINARY STORE ROUTINE .

JFC8

A133 CE A8 40
A135 80 84 05
A139 26 32
A138 80 A1 40
A132 20 F3
A140 FF A1 DF
A146 F6 A1 E0
A149 5C
A144 FE A1 D8
A140 A7 00
A151 27 00
A151 27 00
A155 C1 02
A155 C1 02
A155 C1 02
A155 C1 03
A159 27 01
A156 F6 A1 D8
A160 F7 A1 D8
A160 F6 A1 D8
A160 79 POINT TO FCB
CALL FMS-GET DATA
E RORS?
STORE DATA
REPEAT
STORE INX
STORE B LOX JSR BNE JSR BRA FMS LIST6 MOVE LIST4 XTEMP2 MOVE STX STA B LOA B 1EMP4 TEMP5 LOAD BYTE COUNTER BUMP THE COUNTER LOAD INX BASE ADDRESS STORE A LOA B INC B LOX SIA A CMP B BEQ CMP B XTEMP1 D.X #\$01 JUMP #\$02 JUMP #\$03 PASS [NX [X] PASS INK 1x1 BEO CMP B BEO INX STX STA B LOX LOA B JUMP #\$04 JUMP PASS (NX 1X) STORE INX STORE COUNTER GET OLD INX GE1 OLD 8 GD BACK FOR MORE XTEMP1 1EMPS XTEMP2 TEMP4

* DISK CLOSE ROUTINE *

CET ERROR STATUS

CLOSE FILE CODE STORE IN FCB CALL FMS-CLOSE FILE ERRORS? RETURN TO FLEX REPORT ERROR CLO E LL FILES

A150 A6 01 A15F 81 08 A171 26 0C A173 86 04 A177 A7 00 A177 B0 B4 A17A 26 03 A17C 7E A0 A17F B0 A0 A182 80 B4 A185 7E A0 A BNE LIST9

#4

O.X

FMS

LIST9

WARMS

RPTERR

FMGCLS

WARMS 18 BNE LOA A STA A JSR BNE JMP JSR 00 B4 06 03 A0 03 A0 3F B4 03 A0 D3 JSR WARMS

. MESSAGE SIRING .

A188 40 A189 4F 56	BEGIN	FCC	OVE BIMA Y FILE TOT
A188 45 20			
A180 42 49			
A18F 4E 41 A191 52 59			
A193 20 46			
A195 49 48			
A197 45 20			
A199 54 4F			
A19B 3F 20			
A19D 20	* IN HE	x ROUTE	NE *
A19F 80 DC	INPUT	BSR	GETHEX
A1A1 B7 A1 DC		STA A	TEMP1
A1A4 8D 07		BSR	GETHEX
A1A6 B7 A1 00		SIA A	TEMP2
A1A9 FE A1 DC		LDX	TEMP1
VIVE 33		RTS	
A1AD 60 10	GETHEX	BS	GETACO
A1AF 4B		ASL A	
A180 48 A181 48		ASL A	
A1B1 4B A1B2 4B		ASL A	
A183 16		TAB	
A184 80 09		BSR	GETADO
A186 18		ABA	
A1B7 16		TAB	
A1B8 FB A1 DE		ADO 9	TEMP3
A188 F7 A1 DE		STA B	TEMP3
A18F 80 AD 15	GETADO		GET DHR
A1C2 80 30	00.1100	SUB A	#330
A1C4 28 DF		BM1	OUTS
A1C6 81 09		CMP A	#\$09
A1C8 2F DA		BLE	RERUN
A1CA 81 11 A1CC 28 07		CNP A	/\$11
A1CE 81 16		EMP A	OUTS /\$16
A100 2E 03		BGT	DUTS
A102 80 07		SUB A	#307
A104 39	RERUN	RTS	
A105 7E AD 03	outs	JRP	WARMS
	* RAM S	TO AGE	•
A108	XTEMP1	RME	2
A1DA	XTEMP2	RMB	2
A10C A100	TEMP1	RMB RMB	1
AIDE	TEMP3	RMB	i
ALOF	TEMP4	RMB	i
ALED	TEMPS	RME	1
		EN	

NO ERRORISE DETECTED

Attacks format PAGE

Don Williams BB Micro Journal 5900 Camaandra Spith Ro Hidon, Tennessee 1734J

We are working on some interface and furnace controller experiments for one of our labotatories. Currently, we use a SMTP System and have our experiment modules on the S-30 duts. We would like to make several 4801 based atend-sions endules so there will be more access to these emperiments. We need a 1199 BASEC 1251 with peak and poke to simplify the student - Computer interface (we don't have time to teach assembly jumpaled or mechine laborator) in this coursel. Too Pitman's series version would be satisfactory, if in EPROM. Bo you know of amount who is using such? We cannot really justify some than one ZE or one 4E (EPROM) for the BASIC anterpreter, and do not need floating point.

We have a simple P1D control algorithm and simulated furnace written in TSC Basic we use to demonstrate "tuning" a controller. We will be plaused to share our experiments with amyone,

el Pention

JLP; dpp

Enclosure

William Hartmann RR 2 Box 121-1 Blue Springs, MO 64015

Dear Sir:

April 12, 1982

When I first converted my system to a 6809 FLEX system I was working with a single 5 inch drive. I used a single drive, multiple file copy program, "MCOPY" from

Cone jo Computer Products. This program was very well written and uses FLEX to its maximum to speed up the copy operation. When copying a file MCOPY keeps the original file creation date. I find this convenient to tell which files were current and which had been updated.

Enclosed is a program "DATECOPY" which patches the FLEX COPY.CMD so that the orginal file creation date is retained during the copy. It is written for the 6809 version, but could be used a 6800 if the address shown in the listing can be found.

To create the modified COPY assemble OATECOPY then append

+++ APPEND.COPY.CMD.DATECOPY.BIN.COPY.CMD

2			1111111		20020000	1;11111212111111111111111111111111111
3			1			
4			1 THIS	IS A DV	ERLAY TO	THE FLEXOS COPY. CHO VER 1
5			a TD N	MINTAIN	THE ORIGI	MAL FILE CREATION DATE
6				IG COPY		THE THE GREAT THE
7						
			•••••		••••••	
8						
9						
19						
11			# DRE	SINAL CO	DE	
17			1			
13			1 CIAL	7E CD#3	JMP #	IARHST (9CD03) RETURN TO FLEX
14						
15			1 (75)	BA 41	LDA #5	a1
16			4 6333	A7 B4	STA , 1	MODAL (484444 4054 FOR REAR
17				80 D400	72W F	MSCAL (90486) OPEN FOR READ
18						
19						
20	CI 62			ORG	\$C192	
21	C162 02			FCB	2	MAKE VERSION 02
22						
	CIAI			DRS	SCIAL	PATCH CLEANUP
	CIAI 7E	CETT		JIP	CI WITH	FAIGH CLEANOF
	CIMI /E	(332		गाव	CLHUP	
25						
26	C322					PATCH FILE OPEN
27	C355 BD	C541		JSR	DSAVE	TO SAVE DATE
28						
29						
30			t FIET	EQUATES		
		CDAT	MARKST			
21						
32					5D466	
33		CCDE	FDATE	Eān	SCCDE	FLEX DATE BUFFER
34						
35						
36	C576			OR6	\$C526	AREA PAST COPY
37						
38	C526		DRIFE	DHC	τ	DATE SAVE RIBEER
76	CESS FC	ccec	CTART	1.00	ENATE	DATE SAVE BUFFER SAVE CURRENT DATE
						SHAE COMMENT ANTE
	C526 FD				DBUF	
41	C529 B6	CCIE			FDATE+2	
42	C52C 87	C522			DOUF+2	
43	C52F 7E	€198		JMP	1C188	GG TO COPY
44						
45			t RESTO	RE DATE	ON EXITE	NG
	C532 FC	CS2#	CLAUP		DOUF	-
						CTOOL IN ELEY BATE DIFFED
	C535 FD					STORE IN FLEX DATE BUFFER
	C538 86				DBUF+2	
49	C538 B7	CC19			FDATE+2	
50	C53E 7E	CD#3		JMP	MARMST	RETURN TO FLEX
51						
52			1 GET F	ILE CRE	ATION DAT	Ε
53	C541 88	D486	DSAVE	JSR	FRISCAL	OPEN FILE
			ANHAE			SAVE ERROR CONDICTION
54	C544 34	97		PSHS	CC,9	
55	C546 EC	88 19		LDD	25, 1	GET FILE CREATION DATE
56	C549 FD	CCOE		SID	FDATE	AND SET IN FLEX
57	C54C A6	88 18		LDA	27, 1	
58	C54F 87	CC18		STA	FOATE+2	
59	C552 35	87		PIN.S	CC,D,PC	MESTORE ERROR FLAG AND EXIT
60	,,,,,,	-			,.	
				EMO.	CTADY	

START

FWD



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HELP

Dear Sirs:

1 bought PIMS from Scelbi Publications and have it all working except for the load from cassette command. It would appreciate if someone could help me with it, I have a SWIPC 6800/2 with version 2.3 basic.

Thank you, Richard Price 73090 McKay, Romeo, Mi 48087

SWIPC 8K BASIC 2.3

Need HELP in locating someone who can furnisi source or reference points for SWTPC BASIC Ver. 2.3. I have tape only; it prompts, but will not accept any statement. RUN usually linefilks a couple times and then to "READY" prompt. If no source, I would appreciate a 'dump' of the code so I can check against my copy. Thanks for any help.

Ray Baumiller 1696 4th St. East, Monongahela, PA 15063

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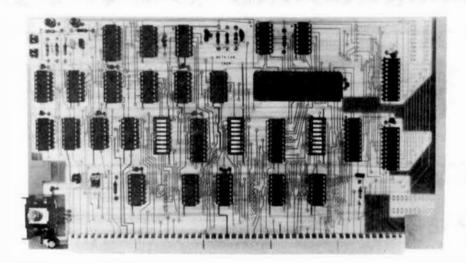
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How to install the Z809

Plug the Z809 Board in an unused SS50 slot. On most SS50 systems, just boot the system using the CP/M disk and you are up and running.

How does the Z809 Softboard System work?

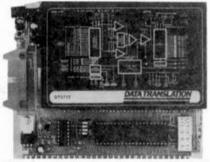
All I/O functions of the Z809 are directed through the 68XX system CPU board. Use your current disk controller board, CPU, memory, disk drives, printer, and terminal with standard SS50 configurations. The Z809 does not affect use of the system CPU. The 2809 does not replace your CPU board. It uses your 68XX as an I/O processor. To change back to your current operating system, just boot the system with the appropriate disk.

Other information on the Z809

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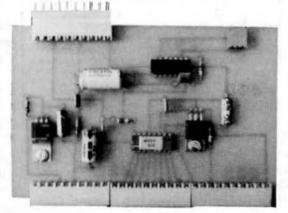
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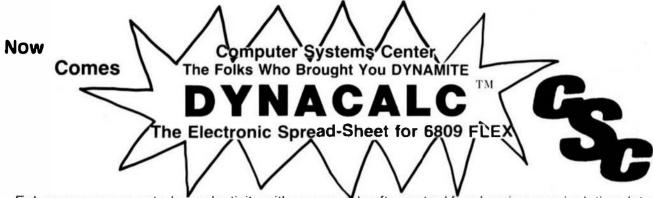
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Compatible with TSC FLEX 9 and all TSC 6809 single
weer software
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- SPECIFICATIONS
 Board site: 10.26" by 10.6"
 Power requirements: ~6 VDC at 3 AMP8
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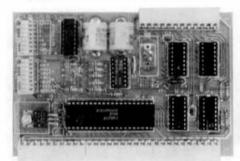
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The Microtext module is a program pack containing not only firmware but a second serial port so that both your printer and modern can be connected at the same time. Microtext can be configured for any serial printer that will work with the Color Computer, even if the requires line feeds! But even if you don't have a printer, you can keep a permanent copy of your data by storing to casserte tape. Also, any Radio Shack/ Centronics-compatible parallel printer may be used by adding the Micro Works' PIBOC parallel interface.

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resequence. The prisary ones are as follows:
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optionally resoluences lines with blank sequence numbers,
checks for new sequence number overflow,
checks for new sequence number overflow,
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runs on the 588% cross-reference program is an assemble program which
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Although our TERE uses alphanuserics exclusively is its securious display (the making it compatible with most every secon-imaged display incuss), the lack of Mirres graphics in a factor and the resemption of the control reports from the control reports fram done control reports fram done control reports fram done control of the control reports fram done control of the making it impossible to all hack and relax. The call way to take this and impossible to all hack and relax. The call way to take this and impossible to all hack and relax. The call way to believe that so much action could be fitted on one serves is to play it.

COLGA-THE is available on cassette for the THS-60 COLOR COMPTIBL, and requires life or may secory (Extended Color Basel (MV required), COLOR-THE, is identical to COLOR-THE, escopi that it requires our [8-1] Speaker Pack wide synthesizer for operation, as the computer uses expitable speech messages continuously throughout program play.

TREE-68 requires a MEMOST-AMPRED display for operation as well as a course of interrupts (see a second, Also, a serial, programmed for Solid literapies per account, Also, a serial, or parallel kepolouri for required (will not run with the MEC interface).

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In Addition, you can perform to ILIX commands directly from SPLLY STR. The SEM version isclides a directory list command which allows you to list disk lists of streetly from SPLLY STX. This means that you don't have to stop and restruct simply becames you have forgetten a file same in the course of proof residual.

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The have developed a method to write a unique [15, mentor accessed failes, in this sector we inchesse on Scharacter accesses code, a Macharacter disk news, an Scharacter accessed to the section of the information sector.

With the littles to you to chake the 1.D. sector sec

your only write-protect

131 LOCK allows you to list- delete- and wr files. With list protection, the list-lo-list when you supply the disk access code!

LIST is a multi-option program, allowing you to translated, and-translents, locked files (if you supply class access code), free space, disk information, or combination of these.

Fig. 6 is a quick and empy mans file deletion program. Each fire on the fair is presented for your impection, Wally, prompts than determine whether or not to delete each file, prompts that determine whether or not to delete each file, and little generates the Little hance; page for your printed littless. You supply a mass for the basker page of up to the velocity and the fair that the current date and time (as contained in Tabili and Tile). DOW is a formatted heatiderism; and ADCII memory dump. Then current and a hard copy derice, page boundaries are honored to make dumps more readable.

000 COUNT allows you to quickly determine file sizes and characters. Williple files may be specified you to count in a single mas those jobs which spread over several files.

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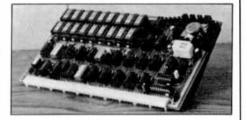
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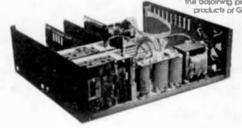
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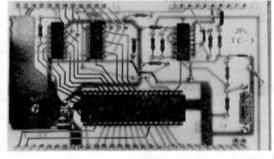
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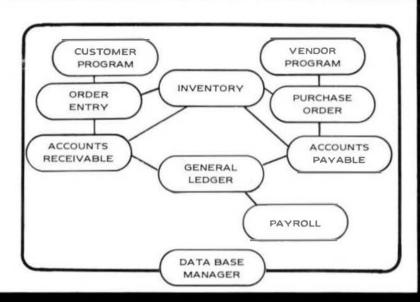
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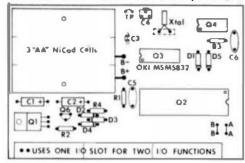
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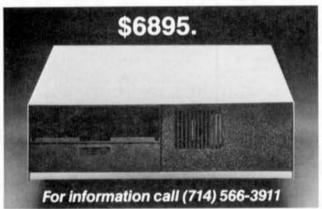
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1681 MICRO JOURNAL ADVERTISERS INDEX

AAA CHICAGO COMPUTER CENTER51,57
ALFORD & ASSOCIATES49
BUSINESS DATA SYSTEMS62
COMPUTER SYSTEM ASSOCIATES59
COMPUTER SYSTEMS CENTER44
COMPUTER SYSTEMS CONSULTANTS, INC47
COMPUWARE CORP56
COMPUWORLD, INC60
D.P. JOHNSON50
DATA SYSTEMS "68"41
DATA-COMP SOUTH EAST MEDIA SUPPLY8,39,62,18C
DIGITAL RESEARCH COMPUTERS54
DUGGER'S GROWING SYSTEMS55,59
ELECTRONIC SPECIALISTS, INC
F & D ASSOCIATES56
FRANK HOGG LABORATORY, INC
GIMIX, INC
GRANITE COMPUTER SYSTEMS
GREAT PLAINS COMPUTER COMPANY, INC48
HAZELWOOD COMPUTER SYSTEMS
HELIX ENTERPRISES
INTROL CORP43
JPC PRODUCTS CO
LUCIDATA Ltd40
MARK DATA PRODUCTS
META LAB42
MICRO TECHNICAL PRODUCTS, INC48,58
MICROWARE SYSTEMS CORP
MICROWORKS46
MRLectronics b.v
ROBERTSON ELECTRONICS45
SMOKE SIGNAL BROADCASTING63
SOUTHEASTERN MICRO SYSTEMS, INC45
SOUTHWEST TECHNICAL PRODUCTS CORPIFC.32.33
SPECIALTY ELECTRONICS, INC50
STAR-KITS52
STYLO SYSTEMS43
SYSTEMES ORMIC
TALBOT MICROSYSTEMS
TECHNICAL MATNTENANCE EQUIPMENT43
TECHNICAL SYSTEMS CONSULTANTS, INC
TERMINUS DESIGN, INC
TEXAS COMPUTER48
THOMAS INSTRUMENTATION
UNIVERSAL DATA RESEARCH, INC53
WASHINGTON COMPUTER SERVICES40
WESTCHESTER APPLIED BUSINESS SYSTEMS47
WINDRUSH MICRO SYSTEMS LIMITED58
WORD'S WORTH61
1681 MICRO JOURNAL50,52
. =

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